Scientific American.

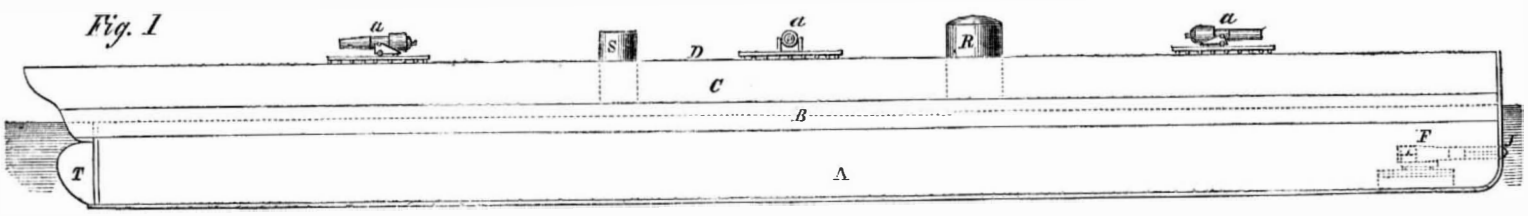
A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. X.---No. 25. (NEW SERIES.)

NEW YORK, JUNE 18, 1864.

SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE

Fig. 1



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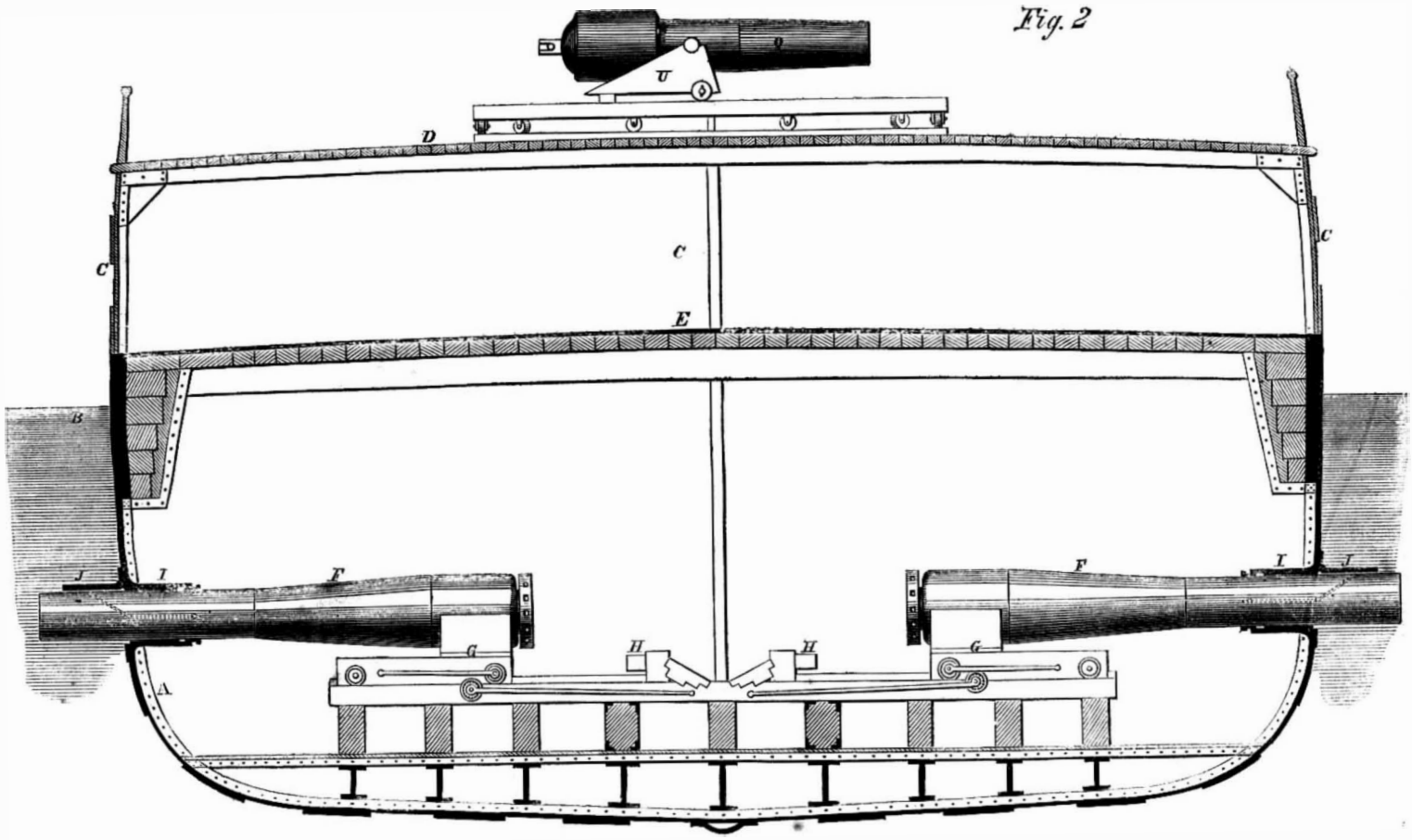

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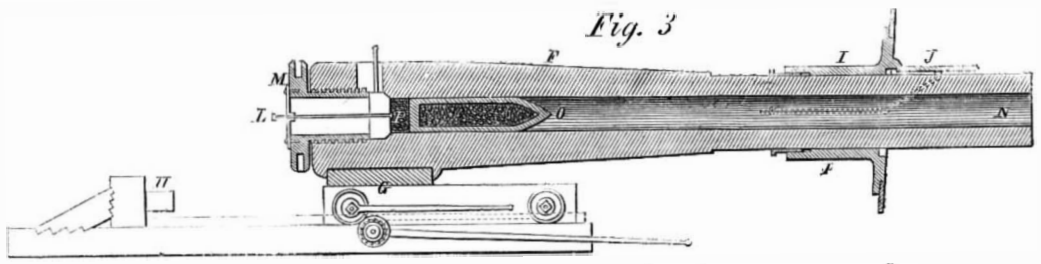

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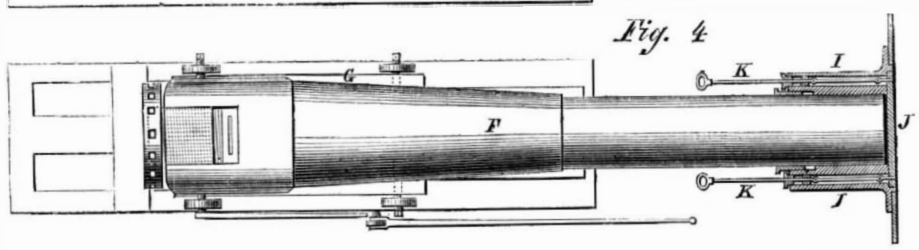

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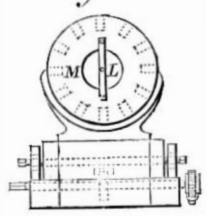
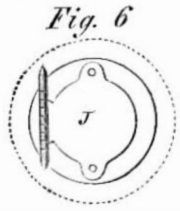


Fig. 6



WOODBURY'S IMPROVED WAR-SHIP AND SUBMARINE GUNS.

Much attention has been given during the last three years to the subject of firing guns under water so as to destroy iron-clad ships by striking them in the most vulnerable part. Since the introduction of iron-plated vessels experiments with this class of ordnance have been extensively tried, both here and abroad, and it has been proven conclusively that the destructive effect of shot fired in this way is very great. The subject is not only important, but highly interesting from every point of view, and the best possible way to test the practical value of submarine firing would be for the Government to construct a vessel on this principle and place her where she may have an opportunity to try her peculiar powers of offense. The plans illustrated herewith represent an improved war-ship of this class; the inventor, Mr. J. P. Woodbury, of Boston, has furnished a description of his ship which is subjoined.

The invention was patented in the United States, May 6, 1862, and has also been secured by Letters Patent in several continental countries of Europe.

Fig. 1 is a side elevation; Fig. 2 is a cross mid-ship section; Fig. 3 is a vertical longitudinal section of one of the submarine guns; Fig. 4 is a top

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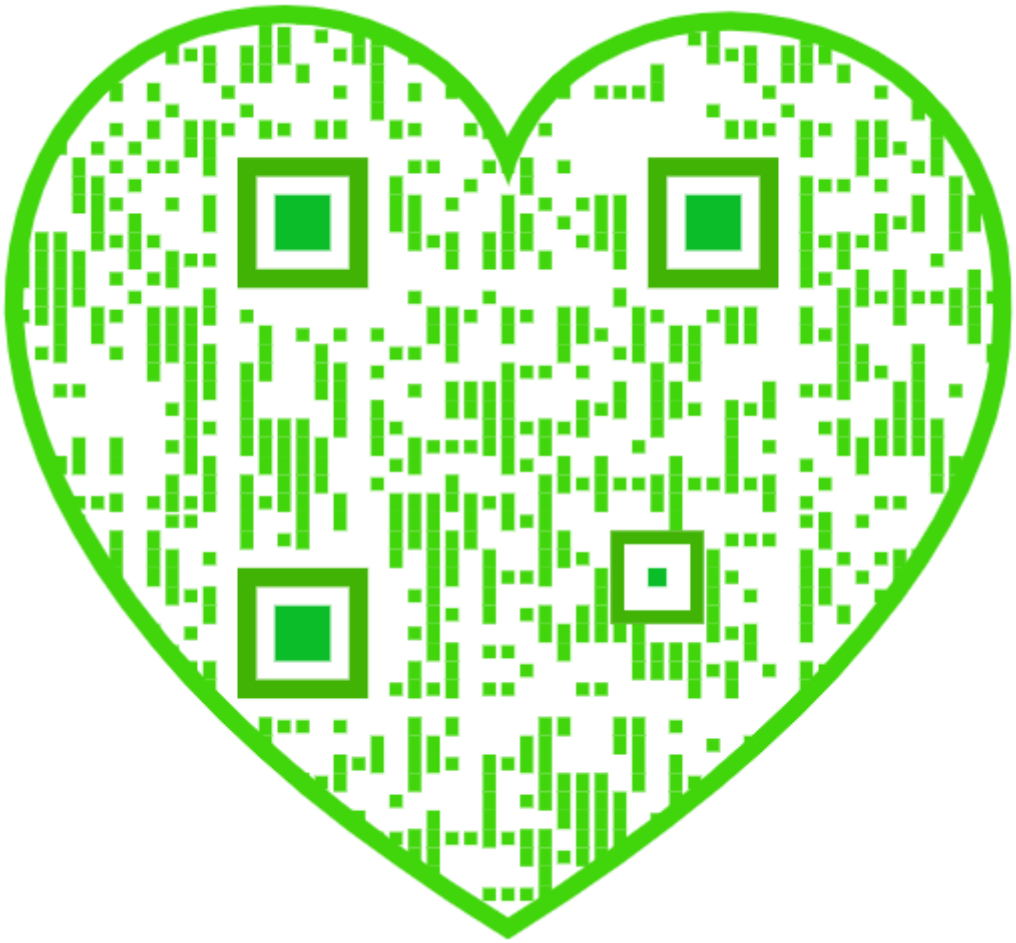

plan of one of the submarine guns run back into the vessel with the port closed; Fig. 5 is a breech end view of one of the submarine guns, and Fig. 6 is an outside plan of one of the ports, or valves, that closes the port-hole when the submarine guns recoil into the vessel after firing. Like parts are indicated by the same letters in the engravings. A is the bottom of the vessel below the bomb-proof plating; B is the iron bomb-proof plating on the sides of the vessel extending five feet below the water line and two feet above the same; C is the space between the bomb-proof deck, E, and the spar deck, D, which is to be built light, either of wood or iron, and is not intended to be invulnerable to shot and shell but to let the same pass through with as little resistance as possible, and at the same time afford light and healthy quarters for the officers and crew while cruising, and to be vacated by going below the bomb-proof deck, or into the bomb-proof pilot house in time of action.

This vessel is intended to have three or more masts with sails in the ordinary manner, which are to be managed from the spar deck, D. E is the iron-clad bomb-proof deck about one or two feet above the water-line; F is one of the submarine guns which are intended to fire shot or shell horizontally eight or ten feet under water and through the bottom of the enemy's vessel; G is the gun carriage that supports the submarine gun and enables it to be run out through the side or bow of the vessel to battery; H, is the india-rubber buffer to take or stop the excess of the recoil of the gun when it comes back into the vessel after being discharged; I is the stuffing-box to enable the gun to be worked without allowing the water to enter the vessel; J is the port or valve that closes the port-hole after the gun is discharged; K are the handles or port rods to enable the port to be opened or closed at pleasure; L is the needle or rod to explode the percussion cap attached to the cartridge for discharging the gun; M is the screw-breech to the gun which is substantially like the Armstrong gun; N is the hollow cylindrical case made of tin or copper, to exclude the water from the bore of the gun so as to allow the shell to obtain a high velocity in an air space before it reaches the water at the muzzle of the gun; O is the shell in the gun; P is the cartridge; Q is one of the Parrott rifled pivot guns mounted on the spar deck en barbette; R is the bomb-proof pilot house which is formed of thick plates of iron and extends from the iron-clad bomb-proof deck several feet above the spar deck; S is the iron bomb-proof smoke stack which also extends from the bomb-proof deck several feet above the spar deck; T is the rudder; U is the gun carriage for the Parrott rifled pivot guns.

It is intended to have large boilers and steam engines with two propellers, one under each quarter of sufficient power to propel this vessel 16 or 18 miles an hour, or turn quickly round at will. This vessel can be built of almost any desirable size, but these plans contemplate the vessel to be about 2,000 tuns burthen. The use of submarine guns on this plan has now been so often tried in this country and England and proved effective, that nothing more need be said on that subject. It is now well known that a shell fired horizontally from one of these submarine guns say 8 or 10 feet under water, at any vessel now afloat, at a distance of 100 feet or more, would tear so large a hole in her side or bottom as to sink her in a few minutes, and perhaps explode her magazine which would destroy her instantly. A vessel of this description affords the men as good quarters as they formerly had on board of old sloops-of-war, and is every way as good a sea boat as any vessel that ever went to sea. Such a vessel as this would be more than a match for any two iron-clad vessels that are now afloat in the world. At sea or in harbor she would sink them both in a short time by the use of her submarine guns.

It is obvious that these submarine guns can be used to explode torpedoes sunk in rivers and harbors by firing large shells so as to have them explode along the bottom of the channel, thereby making a concussion sufficient to destroy any torpedo that may be lodged within several feet of any such exploded shell. It may also be employed to remove river and harbor obstructions by firing large shells into the same, the explosion of which would immediately blow them out of water and allow iron-clad vessels to go into any harbor. They would also have the power to defend New York or any other harbor against any possible naval attack from an enemy. This vessel and its guns was patented on May 6, 1862, by Joseph P. Woodbury, of Boston, Mass.

AGRICULTURAL INVENTIONS.

From the remarks on agricultural implements in the Introductory Report of the Commissioner of Patents for 1863, we take the following extracts:—

"Much attention has also been given in this class to machines for sowing wheat, oats, etc., which are attached to the body of the operator, worked by a crank, and distributing the seed broadcast by centrifugal force. Next in number and importance are cultivators, which appear to have assumed almost every conceivable form and style. The most noticeable feature in connection with them is the making of them tall, and so constructing the frame that they may readily pass over corn from four to six feet high, and in so arranging and pivoting the shares that they may be readily controlled in their movements, and enable the operator to adapt their movements to the irregularity of the plants in the row. This feature, as might be expected, emanates from the West, where the hoe is but little used in the culture of this plant.

"Machines for thrashing and cleaning grain have received a large share of attention, and have been rendered so complete that the grain is now thrashed, cleaned,measured, and bagged, and the straw stacked, at one operation. Improvements have also been made in the machines by which the dust is taken up and conveyed away, and also by which the bands are cut and the sheaves fed into the thrasher. Connected with these is a class of machines of recent origin, by which clover is thrashed, separated from the straw, hulled and cleaned, at one operation.

"Considerable improvements have also been made in a large number of miscellaneous implements connected with agriculture, such as manure distributors, fruit-gatherers, cow-milkers, field-rollers, cattle and sheep racks, farm and fruit ladders, egg-hatching machines, and machines for manufacturing cigars and tobacco in all its varieties, potato-diggers, straw and vegetable cutters, stone-gatherers, bog-cutters for smoothing rough meadow land and adapting it to the use of the mower, boxes and baskets for packing and conveying fruit to market, etc., etc. Indeed, throughout this entire class there appears to be an increased activity in the effort to substitute labor-saving machinery for manual labor, and, judging from appearances, with most beneficial results.

"The number of harvesting machines manufactured during the year, as learned from reliable sources, is upwards of 40,000, while the number in process of manufacture, required for the harvest of 1864, is estimated at over 90,000 machines."

Boiler Explosions.

The following sensible and practical remarks we take from the London *Mechanics' Magazine*, in an article on "Locomotive Boiler Explosions":—

"The time has almost gone by when an explosion was regarded as the result of mysterious agency. It is pretty well known now, that but two causes can lead to the bursting of a steam generator under the conditions of legitimate working. These are simply congenital weakness, due to bad materials or an imperfect method of construction, or induced weakness, the result of over-heated plates, or corrosion. More than 80 per cent of the explosions which occur yearly are the result of this last cause. If we take a hypothetical case of three boilers, of precisely the same form and construction, worked under precisely the same conditions, and exposed to like sources of deterioration, but carrying different pressures; the time when each will explode may be as certainly reckoned on as the moment when a watch wound up to-night will be completely run down. Suppose that one carry 100 lbs., another 75 lbs., and the last 50 lbs. of steam; the first may last five years, the second seven, and the last nine or ten years, simply because the process of destruction may have so far weakened all the boilers that, in five years, they are incapable of carrying 100 lbs. steam, but yet retain strength enough to carry 75 lbs. Therefore, only that one carrying 100 lbs. will be destroyed then; the others must wait until corrosion has done a little more, but they will go in turn. The end of all flesh is death, and the end of all boilers is explosion. An old writer quaintly remarks that, "If a man lives long enough he will certainly die." In the same way, if a boiler is worked long enough it will explode, in spite of all the safety appliances which ever were or ever will be invented. At best these can only provide for the occurrence of certain phenomena which, without this provision, would cause an explosion; but they certainly cannot provide for the occurrence of *all* the phenomena which produce explosions. Until a safety-valve or a fusible plug, is invented which shall stop a leak or put on a patch, or arrest the progress of corrosion, neither one nor the other can prove its title to be esteemed as an infallible specific. The only certain preventive is careful, properly organized and thorough inspection; and the reports of our steam-boiler societies prove its efficacy daily.

"Experience goes to prove that fully as many explosions occur while the engine is in motion, or while the boiler is under steam and the engine at rest, as at any other time. It is almost impossible to trace any connection between the withdrawal of a portion of steam from a boiler and the subsequent explosion of the latter. Could it be proved that the gage either rose or fell perceptibly, the case might be different; but the hand seldom moves, instantaneously at least. The only remarkable phenomenon is, the sudden rise of the water in the glass gage; and this rise from its character would seem to denote a dilation of the whole body of fluid, not a mere foaming or priming, for the gage shows a rise of "solid water" invariably, and not foam, when the boiler is properly full. It is not likely that either of these explosions will ever be found to present any unusual phenomena; but the lesson which they convey is not the less instructive. Inspection, and careful inspection alone, can secure safety, and the sooner steam engine proprietors become convinced of the truth of this proposition, the better for the entire community."

Ancient Use of Scents.

Constantine the Great provided fragrant oils to be burned at the altars of the greater churches in Rome; and St. Paulinus, of Nola, a writer of the end of the fourth, and beginning of the fifth century, tells us how, in his time, wax tapers were made for church use, so as to shed fragrance as they burned:—

"Lumina ceratis adolentur odora papyris."

A perfume in common use, even to this day, was the invention of one of the earliest of the Roman nobles, named Frangipani, and still bears his name; it is a powder, or sachet, composed of every known spice, in equal proportions, to which is added ground iris or orris root, in weight equal to the whole, with one per cent of musk or civet. A liquid of the same name, invented by his grandson Mercutio Frangipani, is also in common use, prepared by digesting the Frangipani powder in rectified spirits, which dissolves out the fragrant principles. This has the merit of being the most lasting perfume made. The perfumes used by the ancients were, undoubtedly, nothing more than the odoriferous gums which naturally exude from various trees and shrubs indigenous to the Eastern hemisphere. That they were very extensively used, and much valued, we have only to read the Scriptures for proofs:—"Who is this that cometh . . . perfumed with myrrh and frankincense, with all the powders of the merchant?"—(Song of Solomon, iii. 6.) Abstaining from the use of perfume in Eastern countries is considered as a sign of humiliation:—"The Lord will take away the tablets, and it shall come to pass that instead of a sweet smell there shall be a stink."—(Exod. xxxv. 22; Isaiah iii. 20—24). The word tablets in this passage means perfume boxes, curiously inlaid, made of metal, wood, and ivory. Some of these boxes may have been made in the shape of buildings, which would explain the word "palaces" in Psalm xiv. 8:—"All thy garments smell of myrrh, and aloes, and cassia, out of the ivory palaces, whereby they have made thee glad." From what is said in Matt. ii. 11, it would appear that perfumes were considered among the most valuable gifts which man could bestow:—"And when they (the wise men) had opened their treasures, they presented unto him (Christ) gifts; gold, and frankincense, and myrrh." As far as we are able to learn, all the perfumes used by the Egyptians and Persians during the early part of the world were dry perfumes, consisting of spikenard (*Nardostachys jatamansi*), myrrh, olibanum, and other gum

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resins, nearly all of which are still in use by the manufacturers of odors. Among the curiosities shown at Alnwick Castle is a vase that was taken from an Egyptian catacomb. It is full of a mixture of gum resins, &c., which evolve a pleasant odor to the present day, although probably 3,000 years old. We have no doubt that the original use of this vase and its contents were for perfuming apartments in the same way that pot pourri is now used.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Thatching.—The object of this invention is to obtain a means whereby the straw of machine-thrashed grain may be used for thatching purposes. Straw thatch was formerly used to a great extent for roofing purposes when grain was thrashed by hand with a flail and the straw left in an unbroken state, but of late years it has been mostly abandoned on account of the very general introduction of the labor-saving thrashing machine, which leaves the straw in a broken and tangled state, utterly unfit for the purpose of thatching as hitherto practiced. This invention consists in attaching strips to both sides of the rafters of a roof as well as to both sides of the studs of a building in such a manner that the exterior straw will be held between the strips by its own elasticity, the space between the strips, if desired, being filled with straw or other similar or suitable material, by which the straw of machine-thrashed grain may be used for the purpose specified. This invention is due to James Weed, of Muscatine, Iowa.

Securing Engravers' Blocks together.—The wood blocks used by engravers are, when of any material size, composed of several pieces, some of which are secured together by glue to form larger pieces which are secured together by bolts so arranged and applied that the parts thus connected may be disconnected and put together again when required. The object of this is to admit of several engravers working simultaneously on the same design, and thereby expedite the engraving of large blocks. The design is drawn upon the block by the artist when the several parts of the former are all connected together, and after the design is drawn the parts of the block are disconnected, and each part given to an engraver, and when the engraving of each part is finished they are again secured together. These blocks are at present secured together by metal rods or bolts turned in biconical form, a screw being cut on each end of the rod and a nut fitted on it, the end passing through a hole in the blocks and the nuts fitted in recesses made in the blocks. This arrangement is attended with considerable trouble and inconvenience in connecting and disconnecting the parts of the block, and the bolts are expensive to manufacture, objections which are fully obviated by this invention. The above invention is by Heber Wells, of No. 42 Ann street, New York.

Machine for trimming the Heels of Boots and Shoes.—This invention consists in the use of a rotary cutter wheel provided with a gage at each end, and having cutters applied to it and fitted in thwarts in such a manner that the heels of boots and shoes may be trimmed with the greatest facility and very expeditiousiy, and a free escape allowed for the shavings so as to effectually prevent the choking or clogging of the cutter wheel. C. H. Helms, of Poughkeepsie, N. Y., is the inventor of the above.

Smelting Furnace.—This invention consists in the employment for the smelting or reduction of iron, copper, lead, silver, gold, and other metals from their ores, of a crucible or other vessel, chamber, or receptacle for containing the ore, so placed in a furnace as to be wholly or for the most part surrounded by the fuel, and so provided with openings or perforations that the flame and heated gaseous products of combustion from the fuel are forced into it, upon it, and through the ore. It also consists in the introduction of the blast to the furnace containing such crucible, vessel, chamber, or receptacle, through a grate, or slotted or perforated bed, whereby it is carried upward with an equally distributed pressure upon and among the fuel, and the flame is so forced in jets through the openings of the said crucible, vessel chamber, or receptable, that the said openings have the effect of so many tuyeres or blow-pipes. The above is the invention of Jonas Winchester, of 36 John street, New York City, and the patent issues to himself and Geo. H. Davies, of Cambridge, Mass., as full assignees. Mr. Davies may also be addressed in relation thereto at 20 Dey street, New York City.

Clothes-rack and Frame.—This invention relates to a new and improved portable clothes rack and frame designed for holding clothes after being ironed, and also at other times, or whenever convenience requires; designed more especially for laundry and bed room use. The invention consists in providing a frame with a series of folding bars placed at each end of the frame, so that they may be folded or adjusted in and out, and having the lower band of the frame provided with pegs, and the frame provided with brackets to admit of it being hung upon the wall. The above invention is by Henry Buell, of Mount Morris, N. Y., and the patent issues to himself and Henry A. Green, of said place, as full assignees.

Artificial Limb.—The principal object of this invention is to combine with the various joints, or with the springs which control the motion of said joints, certain cords or straps in such a manner that by pulling such cords or straps the position of the joints can be adjusted or the tension of the springs regulated to suit different circumstances. The invention consists also in the employment or use of an oval or eccentric pin in the knee-joint in such a manner, that by turning said pin the length of the leg may be slightly altered, either lengthened or shortened, as may be desirable; further in the application of a screw rod rising from the angle-joint to the knee-joint in such a manner that the length of the leg can be adjusted to suit different persons; also in the employment or use of a screw rod connecting the knee-joint with the cup intended to receive the stump in such a manner that the cap can be raised or lowered at pleasure in order to regulate its distance from the knee-joint; further in the application of an adjustable screw in combination with the spring in the ankle-joint, in such a manner that the extent of the motion of the ankle-joint can be regulated, and that in bending the leg forward the screw, by coming in contact with said spring, relieves the leg from the sudden strain to which it would be exposed if its motion should be stopped suddenly; finally, in the employment of an elastic sole and packing in combination with the toe-joint in such a manner that in walking the natural motion of said toe-joint is imitated. G. C. Kirschmann, of 164 Church street, New York City, is the inventor of this improvement.

Wind Wheel.—This invention relates to a new and improved wind wheel, such as are placed on a vertical shaft. The object of the invention is to obtain a wind wheel of the class specified which will operate perfectly in whatever direction the wind may be, and one which will admit of being very readily rendered inoperative when desired, and when in operation rotate with an equal or uniform speed. Altred Trim, of Iconium, Iowa, is the inventor of this improvement.

Machine for cutting and embossing Leather.—This invention relates to a machine intended to cut rectilinear or curved strips of leather, paper, cardboard, muslin, or other similar material, of a uniform size, or to emboss such material at regular intervals, or to cut and emboss it simultaneously by the automatic action of a rising and falling head carrying the cutter or die, or both, in combination with a vertically adjustable bed and reciprocating self-acting feed apparatus. Seth D. Tripp, of Stoneham, Mass., is the inventor of this improvement.

Melting Furnace.—This invention consists in the employment or use for the purpose of melting metals or other materials, of a crucible with double-arched or double-concave bottom and sides, in such a manner that said bottom and sides are braced every way by the double arch and the crucible is prevented from cracking or splitting; also in a crucible provided with rounded corners and fitting in a casing with correspondingly concave seats in such a manner that by said seats the crucible is strengthened and the application of a tap hole to the crucible is rendered practicable; finally in the use of a double-arched cover fitting on the casing in such a manner that by the two arches the works are strengthened and it is prevented from cracking or splitting. John Thomson, of New York City, and Thomas Widdowfield, of Brooklyn, N. Y., are the inventors of this improvement.

FARMERS' CLUB.

From the large number of subjects discussed at the meeting of the Farmers' Club on the 7th of June, we take the following:—

THE ASPARAGUS BEETLE.

Dr. Trimble presented specimens of the egg, the larva, and the perfect beetle of the insect which is proving so destructive to as aragus beds. He remarked that insects eat very little when in the perfect state—that of the fly, moth, or beetle—most of the eating being done when the animal is in the grub or larva state. The curculio beetle does eat a very little, the speaker had fed them on apples. Dr. Trimble further stated that he had examined the crops of a very large number of insectiverous birds this year, and had been surprised to find so few flies in them, the food consisting almost wholly of beetles. This is the case even with the fly-catchers, the broad-billed birds, such as the night-hawk and swallow, which have mouths adopted to catch insects in the air. These observations first led him to a knowledge of the fact that the air is frequently filled with swarms of beetles. Asparagus beds may be freed from these bugs by turning chickens upon them. The speaker found that when his fowls had devoured the beetles and the larva, the small chickens began to feed upon the eggs.

APPLE BORERS.

A letter was read from Benjamin D. Walsh, of Rock Island, Ills., a man who was pronounced by Dr. Trimble to be good authority in entomology. The letter described two specimens of apple-tree borers, and stated that a thorough washing of the trunks of trees with soap about the last of May was a perfect protection against the borer.

THE GAPES IN CHICKENS.

Mr. Bergen stated that the common cause of this very fatal disease is the feeding of chickens with freshly wetted Indian meal; the meal swelling in the stomach. When this food is given to chickens, the meal should be mixed with the water several hours before it is eaten. Some one has suggested that a dough made by mixing Indian meal with urine will cure this disease in chickens.

SPECIAL NOTICES.

ASA BLOOD, of Janesville, Wis., has petitioned for the extension of a patent granted to him on Aug. 27, 1850, for an improvement in obstetric chairs and supporters.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Aug. 15, 1864.

JOHN H. TOWNE, of Philadelphia, Pa., has petitioned for the extension of a patent granted to him on Sept. 3, 1850, for improvements in the direct action steam hammer.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Aug. 22, 1864.

All persons interested are required to appear and show cause why said petitions should not be granted. Persons opposing the extensions are required to file their testimony in writing, at least twenty days before the final hearing.

A Swordfish.

The splendid ship *Donald McKay* was recently docked in London to undergo repairs. On examining her bottom, the horn of a swordfish was found sticking outside of her copper. It had pierced four and a half inches through a plank and had brought up against a timber inside, when it was no doubt broken off from its socket in the head of the fish. Some idea may be formed of the power of the fish and the sharpness of its sword or horn, from this fact. Many similar instances have been recorded from time to time during the past fifty years. No doubt several vessels have been lost, where the sword has pierced through the planking and been withdrawn again, for it does not follow that it has broken off in every case, and thus blocked the opening like a tree-nail. In old or thin planking the sword would make a hole large and open enough to admit of its being withdrawn by a sudden jerk of this powerful fish.

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VISIT TO THF WORKS FO THE PATENT PLUMBAGO CRUCIBLE COMPANY.

Mr. John C. Brough, of England, gives the following account of a visit to the works of the Patent Plumbago Crucible Company, at Battersea, near London:—

THE HISTORY OF CRUCIBLES.

Crucibles have been in use for melting and refining metals from that distant point of time when man exchanged his stone hatchet and bone chisel for implements of bronze. The earliest melting-pots were doubtless made of the plastic and infusible substance —clay; and there is no reason to suppose that they differed essentially from the earthen crucibles now commonly used in our foundries.

As an instrument of scientific research the crucible has held an important position for at least a thousand years. It was constantly used by the first alchemists, and may, indeed, be truly styled the cradle of experimental chemistry. The word "crucible," from the Latin *crux—crucis*, recalls the alchemical practice of marking the vessel with the protective sign of the cross.

USES OF CRUCIBLES.

At the present time crucibles of one form or another are extensively employed by the refiner of gold and silver, the brass-founder, the melters of copper, zinc and malleable iron, the manufacturer of cast-steel, the assayer and the practical chemist. They are made in many different shapes and sizes, and of many materials according to the purposes for which they are intended. For certain chemical experiments requiring high temperature vessels of platinum, porcelain and lime are adopted; but for ordinary metallurgical operations "clay crucibles" and "plumbago crucibles" are exclusively employed. We have now to confine our remarks to these two important classes of crucibles.

MATERIALS AND QUALITIES.

On examining a clay or plumbago crucible we find nothing to excite our surprise. It seems to be merely a rough specimen of pottery that might be easily imitated. Yet the successful makers of crucibles are so few that they might almost be counted on the fingers of two hands. When we take into consideration the qualities which are required in a crucible to enable it to pass victoriously through the ordeal by fire, the paucity of good makers becomes intelligible. The crucible should resist a high temperature without fusing or softening in a sensible degree; it should not be liable to break or crumble when grasped with the tongs; and it ought to be but little affected by the chemical action of the ashes of the fuel. Again, it may be required to withstand the corrosion and permeation of such matters as melted oxide of lead. In some cases crucibles should resist very sudden and great alternations of temperature, so that they may be plunged while cold into a furnace nearly white-hot without cracking. In other cases they are merely required to resist a high temperature after having been gradually heated. Some crucibles are specially remarkable for one quality and others for another, so that in selecting them the conditions to which they will be exposed must be kept in view. The crucibles which present the finest combination of good qualities are those from which the Patent Plumbago Crucible Company takes its name. They support, even when of the largest size, the greatest and most sudden alternations of temperature without cracking; they can be used repeatedly, and their inner surface can be made so smooth that there is no fear of the particles of metal hanging about their sides. Their first cost is necessarily high, as plumbago is an expensive raw material; but the fact that they may be used for a great number of meltings makes them in reality cheaper than the ordinary clay pots. As fire-clay contracts considerably when exposed to a high temperature it cannot be used alone for large crucibles. The so-called "clay crucibles" are made of a mixture of the plastic clay and some other substance, such as highly-burnt fire-clay, silica or coke, which counteracts in a measure the evil due to contraction, and so lessens the tendency of the vessels to crack. The large Stourbridge clay crucibles, so extensively employed by the brass-founders of Birmingham, contain both burnt clay and coke. The Cornish and Hessian crucibles are made of peculiar kinds of clay in admixture with sand. The great superiority of the plumbago crucibles over these can be easily accounted for by the fact that graphite or plumbago is the most infusible of all substances known, and at the same time a material that can be thoroughly incorporated with the clay without impairing its plasticity.

SKETCH OF THE WORKS.

The works of the Patent Plumbago Crucible Company cover a large space of ground at Battersea, and have a good river frontage. As we proceed along the lane which leads from near Battersea Bridge, we find that the ground gets blacker and blacker, and before we reach the threshold of the office we notice the familiar black-lead polish beneath our feet. Passing a regiment of clerks, we enter the private office of the manager of the works, where we put on a very large coat and a very old hat, which are kept for the use of clean visitors. There are many things in this little office which attract our attention. The walls are covered with testimonials from British and foreign mints respecting the excellence of the Company's manufactures, with here and there a prize medal. The International Exhibition of 1862 is recalled, not merely by the Prize Medals awarded to the Company for crucibles and black-leads, but also by the splendid collection of samples of plumbago, which formed such a striking feature in Class I. In this collection every quality of plumbago is represented by specimens from all the most celebrated mines, particularly those of Ceylon, Germany, Spain, Siberia, Canada, Finland, and Borrowdale. We learn from the manager that some of the samples would not be adapted for the manufactures of the Company. The Siberian plumbago for instance contains too much iron, and although this could be entirely removed by the Company's patented process for purifying plumbago, it is found cheaper to work with the Ceylon plumbago, which contains but little iron.

WHAT PLUMBAGO IS.

Before we leave this snug office for the busy factory, we will jot down a few notes on plumbago, or, to use its more correct name—graphite. The old mineralogists, misled by its remarkable metallic lustre, placed graphite among the metals, and at the present time there are doubtless many persons who accept "black-lead" as an appropriate name for this substance. In most dictionaries graphite is defined as "carburet of iron," in accordance with the opinion formerly held by most chemists that it was a compound of carbon and iron. This definition is now known to be incorrect, for although iron is generally present in graphite, it must not be regarded as an essential constituent, any more than the silica or alumina which usually accompanies it. The iron, silica, and alumina, when present, are simply in a state of mixture, and not chemically combined. Graphite is one of the forms of *carbon*, that protean element which also occurs native as the sparkling diamond and the black and lustrous anthracite, and which also appears in the familiar shapes of charcoal, coke, and lamp-black. According to Dr. Wood's analysis of a sample of the graphite used at these works, it contained upwards of 98 per cent of pure carbon, the remainder being silica with mere traces of iron and alumina. Few samples have been found to contain less than 95 per cent. The veri-form character of carbon is exhibited by graphite itself, for it is sometimes crystalline and sometimes amorphous. The crystallized, or foliated graphite, is found occasionally in six-sided tabular crystals, but commonly in foliated or granular masses. It is chiefly obtained from Ceylon, where it is found imbedded in quartz. It is also found near Moreton Bay, in Australia; in the States of New York and Massachusetts, and in Siberia. The amorphous graphite is that variety to which the terms "plumbago" and "black-lead" are ordinarily applied. It is much softer than the crystalline graphite, and makes a blacker streak on paper. Formerly it was obtained almost exclusively from Borrowdale, in Cumberland, but the mine there is nearly exhausted, and we believe is no longer worked. The bulk of that used at present comes from Germany, principally from Griesbach, near Passau. Both varieties are used in the manufactures of the Company; the crystalline for crucibles, and the amorphous for polishing powders.

The consumption of Ceylon graphite at the Battersea works has had an extraordinary effect upon the price of the article. When the Company commenced business it cost about £10 per tun, but now it cannot be bought at double that price. In Ceylon we hear that applications to dig graphite are daily on the increase, notwithstanding the rate of 14s. per tun which has to be paid as royalty at the Colombo Cutcherry. The following figures, giving the amount of revenue collected at Colombo and Galle, on account of royalty, in 1862 and 1863, clearly show the extraordinary increase in the demand for Ceylon graphite:—

	1862.	1863.	Increase.
Western Province...	£472 4s. 4d.	1,272 10 2	800 5 10
Southern Province..	£112 2s. 8d.	282 8 5	170 5 9

The total quantity of graphite exported from Ceylon in 1862 was 40,895 cwt., of which no less than 34,730 cwt. was shipped to Great Britain. The Customs' returns last year have not reached us. We do not wish it to be understood that the Patent Plumbago Crucible Company use up all the Ceylon graphite brought to the United Kingdom, but it is well known that they are the principal consumers. We must now take leave of chemistry and statistics, and see what there is to be seen at the Black Potteries.

THE RECEIVING STORES.

We commence our tour of inspection at the Receiving Stores, where we are shown the stock of raw material, which comprises at present about 2,000 casks of graphite, each one holding from four to five cwt. The heads of a couple of casks are broken open, in order that we may compare the hard iron-gray fragments of the Ceylon graphite with the black, dull, friable lumps of the German variety. A piece of the latter pressed between the finger and thumb feels pleasantly soft, and flattens readily into a lustrous cake. From the stores we pass to the engine-house to take a peep at the prime mover of the machinery employed on the factory. One horizontal engine, 25-horse power, serves to do all the work that does not require skilled hands.

PROCESS OF MANUFACTURE.

The grinding-room contains several mills of different construction for grinding and mixing the materials of which the crucibles are formed. In one corner we see two huge stones chasing one another round a shaft, and pitilessly crushing the hard lumps of dried clay that are thrown in their path. Here we see a powerful mill for grinding the graphite; and here again, an ordinary pug-mill for incorporating the graphite with the clays. The noise made by these machines is almost unbearable, but it is not the only noise we have to put up with. A brisk rattle is maintained by a number of workmen who are occupied in sorting the pieces of graphite into different sizes and qualities by the aid of metallic sieves. When the graphite is reduced to powder, it is conveyed to the upper floor by an endless band-lift, and sifted by a contrivance similar to an ordinary flour-dressing machine. One of these machines is provided with a silk-gauze drum of remarkable fineness, and is reserved for the preparation of plumbago for anti-friction purposes.

Following the graphite to the upper floor, we enter the mixing room, where the most important operation in the crucible manufacture is performed. A number of large bins, each containing a distinct variety of clay in powder or a certain quality of plumbago, are ranged round the room. Upon the proportions of these several ingredients taken to form the mixture, or, "metal" as it is technically termed, the quality of crucibles depends. The actual proportions of Stourbridge and other clays used are of course kept secret. The ground graphite having been mixed with the clays, the whole is wetted with a sufficient quantity of water and allowed to soak for some time. Having been "pugged" in the mill, the tempered "metal" is formed into blocks and then placed in a store-room, where it is allowed to remain for several weeks.

We now enter the potter's room where the crucibles are fashioned. This room might be a part of any large pottery, were it not for the funereal hue of everything around. On each side are ranged the lathes or wheels, all driven by steam-power, but resembling in other respects the potter's wheel of the earliest ages. Let us watch the growth of one large crucible. The "thrower" takes the necessary quantity of "metal" and submits it to the operation of the "wedging," which consists in tearing or cutting it into two pieces and striking them together again with great force. This he repeats until the metal becomes perfectly tractable. He then dashes the mass upon the revolving disk of his lathe, and presses it with his wet

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hands till it assumes an irregular conical form. He then makes it take a variety of forms with the object of getting rid of all air-bubbles. It is impossible to follow the mass through its numerous changes, but suddenly, when we least expect it, it takes the shape of the crucible. This shape is very rude at first, but under the skillful hands of the thrower it soon becomes beautifully symmetrical. A wire guide is fixed at a certain hight above, and at a certain distance from, the revolving mass, and to this the thrower gradually brings the edge of the crucible. With this simple guide he can make a dozen pots resembling each other so perfectly in shape and size, that the most experienced eye can hardly detect any variation in them. The skittle pots are made in precisely the same way, but are contracted at the mouth after the inside has been properly shaped. Many of the fire-resisting goods manufactured by the Company are shaped by molds, or by the aid of modeling tools. One of these miscellaneous articles which we see in course of construction is a large bath, five feet long by a foot and a half wide, intended to hold molten zinc. This we are told is for a French order.

We now follow the pots to the drying-room. Through the center of this room the upper part of one of the kilns passes, and the heat which would otherwise be wasted is thus applied to a useful purpose. Here we find regiments of pots undergoing the drying process. Many of them have the graceful form of the once-celebrated Picardy pots, and are intended for the French mints. Though unbaked, each article that has remained sufficiently long in the room gives a clear metallic ring when struck.

The kilns are large conical chambers like those of ordinary potteries. The goods to be "fired" are packed in cylindrical cases of fire-clay called "seggars," and these are piled one above the other in the kiln like the basaltic columns of Staffa, and are luted closely together. These seggars protect the goods from the action of the air, which, at a high temperature, would have the effect of whitening their external surfaces, and so rendering them unsightly. We have the good fortune to be present as the workmen are engaged in emptying a kiln. We see that the crucibles come from their fire-clay cases exactly as they are sent out from the works. The absurd practice of giving plumbago crucibles a factitious polish and smoothness generally followed by Continental makers is not adopted by the Company.

From the kiln the goods are conveyed to the store-room, or to the packing-room if they have to be shipped at once. The goods are nearly always packed in old sugar hogsheads, which are strong, large, cheap, and plentiful. Turning out on to the wharf, we see thirty of these hogsheads packed ready to be shipped for Vienna; and lying alongside, 150 cases containing crucibles for the Italian Government. These orders, not by any means unusual in magnitude, will enable our readers to form an idea of the scale upon which the operations of the Company are conducted.

SPECIMENS OF THE WARE.

We now cross the yard to the workshops of the Clay department, where various descriptions of crucibles are manufactured. The larger sizes, as in the case of plumbago crucibles, are made at the potter's wheel, but the smaller, in which the Company can successfully compete with the best French makers, are fashioned by beating the clay upon boxwood mandrils. The so-called "white-fluxing pots" are really beautiful specimens of earthenware, and are acknowledged by the best authorities on metallurgy to be very refractory, and to withstand the action of fluxes in a most remarkable manner. Every pot is made by gage, and each molder is consequently provided with a great number of pattern ribs cut from boxwood and ebony. The little crucibles ueed in assaying almost equal the German porcelain crucibles in thinness and smoothness. The smallest are not much more than an inch high. Besides crucibles, all kinds of clay instruments used in assaying are here manufactured, such as scorifiers, roasting dishes, and muffles. The convenient clay furnaces used by assayers, dentists, and experimental chemists, are also made in great numbers.

Let us now turn back to the store-room and look at a few of the curiosities that are to be found there. We have just been speaking of a crucible about an inch high. Here is one of the pattern supplied to the Royal Mints, intended for melting 600 pounds weight of silver. Here again is another plumbago pot, made specially for zincing the Armstrong shot, and which will hold 800 lbs. of molten zinc. The medium-sized plumbago pots now so extensively employed for melting silver, gold, copper, and malleable iron, are, of course, the most important products of the works. All the pots are numbered according to their contents, each number standing for one kilogramme, or a little over two pounds; thus, a No. 2 crucible contains two kilogrammes; a No. 3, three kilogrammes, and so on. Covers, stands, and stirrers of plumbago are kept in stock with every conceivable article of fire-clay, from the huge glass pot down to the humble fire-ball for the parlor grate.

MANUFACTURE OF BLACK-LEAD.

The graphite imported by the Company is not used solely in the manufacture of melting-pots and metallurgical apparatus. A good proportion of this valuable raw material is prepared for domestic purposes, and sent from the Battersea Works in the form of ordinary "black-lead." As this article is used wherever there is a grate or stove to be kept bright, its annual consumption must be very large. There is no substitute for it—nothing that can be employed in the same way to polish and protect the iron-work of common fire-places. Without the factitious lustre produced by the action of "elbow-grease" on black-lead, the most elaborate kitchen range would soon become unsightly, the trim parlor grate would blush with rust, and the cottager's "wee bit ingle" would leave off "blinkin' bonnily."

The various qualities of black-lead which the Company sends into the market under different fanciful names, are all prepared from graphite or plumbago, and nothing else. The higher qualities are distinguished from the lower by their superior fineness, softness, and luster; but chemically they are identical. The articles sold under the sentimental name of "Servants' Friend" at 28s. per cwt. is quite as pure as the "Prize Medal Luster," which fetches double the price, or "Halse's Roman Luster," the best quality of black-lead manufactured by the Company. Again, the analytical chemist would fail to detect any essential difference between either of the above-named products and the article labelled "carburet of iron," in remembrance of the exploded opinion respecting the nature of graphite. How comes it, then, that one quality is so much superior to another? The explanation is simple enough. The differences in the manufactured article may be traced to certain variations in the physical properties of the raw material. Thus one sample of graphite may be soft and lustrous, while another, equally pure, may be hard and dull. These variations are subordinate to the distinction between amorphous and crystallized graphite, to which we have already referred. For making domestic black-lead, the amorphous or soft graphite is almost exclusively used.

The separation of the different qualities of graphite is a labor which demands great experience and judgment, and can only be successfully performed by the old hands. The best pieces are soft and unctuous, perfectly free from grit, and capable of receiving a very high polish. The worst pieces, technically called "gruffs," are, on the contrary, harsh, gritty, and deficient in luster. The latter are only employed for making "leads" of the lowest brands. The numerous intermediate qualities are distinguished one from another by characters which are only apparent to the experienced eye.

The manufacture of black-leads includes three distinct operations—grinding, sifting, and packing. At the Battersea Works, the first operation is performed by means of a large mill driven by steam power. The ground "lead" is conveyed to an upper floor by an endless-band elevator, and is then sifted through the finest silk in the simple dressing machine already noticed. The packing is chiefly done by boys, who work with marvellous rapidity. The powdered black-leads are done up in neat packets in quantities from two ounces upwards; they are also packed in 1-lb. tin canisters and in wooden boxes. Papers of various colors are used to form the small packets, so that the the different qualities may be readily distinguished. A paper covered on one side with burnished black-lead is employed for wrapping up some of the higher qualities.

Two descriptions of "blocked black-lead" are manufactured by the Company. The blocks are formed by pressing the powdered and sifted graphite into suitable molds by the aid of machinery, very similar in construction to that employed for making bricks, though, of course, on a much smaller scale. There are two blocking-machines constantly at work, and the number of little bricks they turn out annually would amply suffice for the building of a Liliputian city.

The organization of labor is thoroughly understood at the Battersea Works. There is a place for every man, and every man is in his place. A strict code of rules is enforced by fines; but these fines are paid over to the Fund of the Workmen's Provident Club. We have been over many great industrial establishments, but have not seen any better managed than this crucible factory.

THE BATTERSEA WORKS.

A few days after writing the above we paid a visit to the establishment of Messrs. Brown & Wingrove, the refiners to the Bank of England, where we saw a hundred ounces of silver poured out from a plumbago crucible which had been used again and again. Here, indeed, as at many other great establishments, the Patent Plumbago Crucibles are alone used. We were informed by the courteous manager of the refinery, that the pots never cracked, but gradually became thinner until a point was reached when it would be unsafe to trust a charge in them. He assured us that 50,000 ounces of silver and upwards had been melted in one 1,000-oz. pot. We were glad to receive such good testimony to the value of the plumbago crucibles, for all that we saw at Battersea gave us a most favorable impression of the manufactures of the Company.

Norman Scott Russell on Turret Ships.

At a meeting of the Institution of Naval Architects (London) on the 18th of March, 1864, Mr. Russell read a paper on the merits of broadside guns and turret guns.

Adverting to the supposition, made by Capt. Coles and others, that 300 or 600-pounder guns, weighing from twelve to twenty tuns each, cannot be carried as broadside guns, Mr. Norman S. Russell shows, by some simple calculations, that this assumption is absolutely erroneous. Such vessels as the *Warrior* are quite capable of carrying a full armament of 12-tun guns, instead of their present 68-pounders, without increasing their displacement more than two or three inches, or losing their stability. With regard to the difficulty of training such heavy guns, that is already felt with the 95-cwt. 68-pounder, to such an extent that it is doubtful whether it could be used in a heavy sea-way. However, Mr. Cunningham's very simple application of steam power to the working of ships' guns disposes of the difficulty as regards either class. With respect to the width of port, Mr. Russell admits that, for the 300-pounder, the broadside port would have to be 28 inches wide, to allow of training to an angle of 60 degrees against a width of 23 inches in the cupola port. But he considers that Capt. Coles has far overstated the question in assuming 3 feet square for the broadside port. Mr. Russell also admits the advantage which the cupola system presents in the weight of the battery being borne amidships, so as to cause less rolling than heavy weights winged outwards. The great arc of training commanded by the turret is one of the chief advantages claimed for it. Mr. Russell considers this much over-rated, especially when more than one cupola is carried, on account of the obstacles offered by masts and rigging, boats, hatchways, and especially by the other cupolas, if the vessel carries more than one. In the vessels designed by Mr. Coles there is great disadvantage in the main deck being at so much lower a level than is usual in vessels of similar tunnage—thus exposing the deck to vertical fire from ships with higher topsides, and, moreover, being washed by green seas where other vessels have a dry deck. With regard to the depression of the gun, Mr. Russell remarks that it is doubtful whether in any case a lee gun could be used with advantage in a sea heavy enough to wash the gun deck; and as to the weather guns, a broadside gun could certainly be depressed more than a turret gun placed amid-ships, unless the latter fired through her own deck and topside. Mr. Russell then proceeds to compare in detail the merits of ships carrying one, two, or three cupolas, with

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vessels carrying the same weight (in guns and armor plating together) distributed as a broadside battery. The result, as he gives it, is that for one cupola, as against the corresponding broadside ship, the cupola has the advantage; for two cupolas the advantages are, if anything, in favor of the broadside, although nearly balanced; but for three or more cupolas, the broadside arrangement has a marked superiority, which increases in a rapid ratio with the size of the vessel. He accordingly comes to the conclusion that the proper use of the turret is for moderate sized vessels carrying one, or, at most, two of them; and he thinks that one or two cupolas may be usefully substituted for pivot guns on the upper decks of ships of the line carrying a heavy broadside armament. Finally, he remarks that this is a question for the naval officer, rather than for the naval architect, to decide, since neither plan presents any constructive difficulty, and he quotes Capt. Symonds' authority for stating that speed and facility of maneuvering are of at least as high importance as complete protection.

Correspondence

Geological Age of the Desert of Sahara.

MESSRS. EDITORS:—Recent discoveries made in this great tract of barren land by the French commission of scientific gentlemen, have decided this mooted point, at least so far as the northern half of it is concerned, as far south as the ridge of table land dividing the southern slope from the northern. It formerly has been held that the age of this largest desert of the globe was tertiary. But M. Desor, a gentleman well-known in scientific circles for his devotion to surface geology, and who has traveled extensively in our country, has settled the question that the northern half of Sahara is part tertiary or modern, by the finding, far inland, deposits of shells, such as the edible clam, perriwinkle and muscle, which now live in the Mediterranean ; in other words, of the same age as the bordering edge of the Atlantic from Martha's Vineyard to Cape Sable in Florida.

The most interesting discovery in geological science has been made by the Canadian geologists; this is the presence of organic forms in the so-called Laurentian formation of Canada; the primitive of older writers, and azoic of modern, because of the absence of all signs of life having existed in that age of the world when its strata were formed. The stone-record of ancient life has been heretofore supposed to terminate with the Taconic, or that age or system of rocks which immediately succeeds the azoic.

In the progress of the geological survey of the State of New York, the late very eminent Dr. Emmons demonstrated that the authentic records of life went back further than the English and New England school of geologists placed it, viz., at the base of the silurian or the Pottsdam sand-stone of New York State, and he even suspected that certain lime-stones of the primitive were zoic.

Early in the writings of the former Dr. Mantell, of England, are figured and described certain forms in granite which were suspected to be the rings of infusoria. It was reserved for the Canadian gentlemen to demonstrate that the simplest forms of animal life, viz., rhizopods or foraminifera, had been preserved to us in the (primitive) Laurentian of Canada. The shell of the animal is still preserved in lime, while the cavities once filled by the body of the living animal are now found to be filled by deposits of silica, aluminous material, serpentine and pyroxene. By means of acids the lime can be removed and the form of the animal's body, preserved in the silicious cast, is exactly ascertained. A noticeable feature of the rhizopods of the Laurentian, are their magnitude. In the silurian, as found in the galena lead bearing rocks, and in the northern regions of Frobisher's straits, as discovered by Charles Hall, the latest arctic explorer, they were of monstrous dimensions. In the recent seas they are almost always microscopical.

It seems to be a law that the various forms of animal life shall begin at the minimum of size and numbers, increase to the maximum, and then suffer a decline, until they either disappear or linger but the shadow of their former glory and power. Guided by this law of analogy, supposing it to hold authority in this earliest period of animal life, our imaginations are carried back to a period immensely remote in the antiquity of time, when life began in the primitive seas, in its simplest forms—the very first letter of its alphabet—and gradually increased in its maximum, before other forms were introduced which have become familiar to us in Taconic strata.

R. S. STEVENS.

New York, June 9, 1864.

THE REBEL TORPEDOES.

Appended is a copy of a report made to the Ord, nance Department upon some new rebel torpedoes recently found in the Rappahannock. We are under obligations to Commander H. A. Wise, Chief of Ordnance for the report and diagram.

U. S. S. *Matthew Vassar*,
May 18th, 1864.

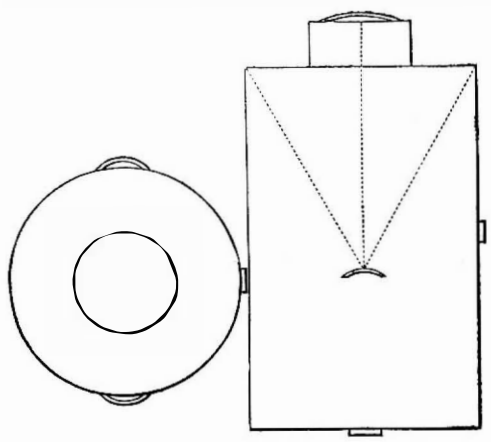
SIR:—In obedience to your order, I report the following experience in the use of a torpedo, taken from the rebels in the Rappahannock river:—

The torpedo is a cylindrical tin vessel, with a second small cylinder at the top, and with three apertures—one on the side and bottom, for the purpose of receiving the powder, which apertures are afterwards closed with a gutta percha wad; and on the wad, outside, is a covering of bees-wax and tallow. The other aperture is at the top, and is for the purpose of receiving a friction primer, which is put in *first*, and the aperture then made water-tight, by filling in with bees-wax and tallow, mixed.

The friction primer is attached to the end of a wire, —which extends from the outside to the center of the vessel—so that the primer lays in the middle of the powder always.

To prevent the primers from having any lateral motion, three wires are soldered on to the sides of the vessel, and join in the middle nearly; so that the primers may pass through their bent ends, without danger of catching or moving. The small cylinder at the top of the torpedo is covered with a tin cap, so as to hold the pulling line, and prevent it from being touched until the torpedo is sunk, at which time the cap is removed, and the line led out to the shore.

The torpedo holds about fifty pounds of fine priming powder: and I enclose here a diagram, showing dimension, etc,



Length of case, 14 inches; diameter of case, 12¼ inches; length of cupola, 4 inches; diameter of cupola, 4 inches; length of tubs, ¾ inches; diameter of tubs, 1¼ inches.

After informing myself thoroughly as to the manner of using this new weapon (by carefully opening one,) I exploded another in the following manner:—Having attached a sinking weight to the two handles, which are on the sides, I pulled with a small boat into the channel, and then ran my line ashore; and after this was done, I carefully removed the tin cap, and lowered the torpedo in three fathoms water. The boat was then pulled ashore, and the line pulled from about fifty yards back, in the bushes, when, without any noise, a column of water, sixty feet high, and five feet in diameter, was thrown up; and covering the woods with spray, fell, sending a circular wave about one foot high to the surrounding shores. The appearance was grand, and if a ship was directly over one of these torpedoes, she would in all probability be sunk, but if alongside, (except receiving a quantity of water on deck,) I do not believe she would be injured.

With the information gained, I feel competent to use the remaining torpedoes against the rebels, whenever it is required of me.

T. H. EASTMAN, Lieut. Comdr. U. S. N.,
Comdr. Foxhall A. Parker, Comd'g. Potomac Flotilla.

Mode of Silvering Wood.

MESSRS. EDITORS:—On page 350, of the current volume of the SCIENTIFIC AMERICAN, you state that you know of no method of silvering woods. Thinknig it will be of some service I herewith send you a process, an experiment of Mr. Spencer of England. The first operation is to take strong alcohol or spirits of turpentine in a glass vessel, and add to it a piece of phosphorus (a common corked vial will answer the purpose); the vessel must now be placed in hot water for a few minutes, and occasionally shaken; by this means the alcohol will take up about a three-hundredth part of its bulk of phosphorus. Next procure a weak solution of nitrate of silver, place it in a flat dish or saucer; the face of the wood must now be dipped in this solution, and let itremain a few minutes to allow capillary attraction to draw it into the wood. This operation being performed a small portion of the solution of phosphorus must be placed in a capsule or watch-glass, and this placed on a sand-bath that it may gradually evaporte. The wood must now be held with its surface over the vapor, and an immediate change takes place; the nitrate of glass is decomposed, and gives place to metallic silver. When the material to be acted on is not very large, fasten it to the top of a bell-glass receiver with a bit of pitch or cement, and placed thus over the capsule on the sand-bath; the phosphorus vapor is by this means equally diffused, and not dissipated. A solution of phosphorus in sulphuric ether also answers; and a solution of gold (chloride) may be used. This elegant process as applied to wood and those substances which may be wetted with the solution of nitrate of silver, answer perfectly; but it is obviously limited in its application to those substances which will absorb an aqueous solution.

CHARLES S. OBERTEUFFER.

Philadelphia, May 25, 1864

RE-ISSUE OF A PATENT CASE—IMPORTANT DECISION.

We give the following abstract of a very interesting patent case, the first of its kind, decided by the Supreme Court of the District of Columbia, on June 6th instant:—

UNITED STATES *ex rel.* ANDREW WHITELY, *versus* COMMISSIONER OF PATENTS.

On the 4th of September, 1855, Jonathan Haines obtained a patent for the United States, for improvements in mowing machines. On the 22d Nov., 1856, he granted the right to the invention, as then secured in the State of Ohio, to Ball, Aultman & Co. On the 13th of April, 1858, Haines obtained a re-issue upon said patent. On January 15th, 1860, Haines assigned the undivided third of the patent to his brother Ansel Haines. On 25th January, 1860, Jonathan and Ansel Haines granted to I. A. and W. C. Hawley a license to make, etc., "the Haines Illinois Mower," in certain counties in Illinois. On the 10th of April, 1863, Ansel re-assigned to Jonathan all his right, thus revesting in the patentee the whole interest in the patent and invention, excepting the above interests in Illinois and Ohio. On the 17th April, 1863, Haines, the patentee, assigned to Andrew Whitely, all his right, title and interest in the invention and patent; and upon the 20th May, 1863, executed a further assignment, expressly authorizing Whitely to reissue, and to do all that he could do, if he had retained the interest thus transferred to Whitely. Upon May 21st, 1863, the said Whitely, surrendered the original re-issued patent, paid in the fee, and in all other respects complied with the regulations of the law, and asked a second re-issue.

The second re-issue was necessary, because under the first re-issue, the patent was too defective to sustain a suit, and the grantees of Ohio, taking advantage of this defect, were making and selling many thousand machines in Whitely's territory. They were requested to unite in the application for re-issue, but refused to do so. The Commissioner of Patents held, that Whitely was not the proper person to ap-

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ply for re-issue, but that it was necessary for the licensees of Illinois, and the grantees of Ohio, to unite with him in the application; so that the re-issue would issue in the names of the assignees of the entire interest: and refused to examine the application, or to place it on the files of the office, or to place the fees paid to the credit of the patent fund, and held the papers and fees subject to the order of the applicant.

After long delays, the application was made to the Supreme Court of the District of Columbia for a writ of *mandamus* commanding the Commissioner to examine etc., the application; and, after due argument, on the 7th of March, the Court issued an alternative *mandamus*, returnable immediately. The writ was personally served the day of its issue, but the Commissioner refused to obey it or to make any return. Accordingly a motion for a peremptory *mandanus* was filed on the 21st of May, a copy served by the Marshal upon the Commissioner, and 28th of May set for hearing: on that day the Commissioner appeared by attorney and asked for a continuance of twenty days; the Court continued the case until June 4th only, because of its early adjournment. On that day the case came up for argument upon the motion for peremptory writ, and John L. Hayes, Esq., Chief Clerk of the Patent Office, appeared for the Commissioner and read his return, denying the jurisdiction of the Court, and the right of Whitely as grantee of a sectional interest, to apply for a re-issue.

J. C. Clayton, Esq., of Washington, appeared for the relator, and argued the case at length, and cited copiously from authorities, to sustain the following points:—

1. The grantee of an exclusive sectional interest in a patent is entitled to a re-issue.

2. The Commissioner is commanded by law to examine, etc., a proper and legal application for a re-issue, and *mandamus* is the proper remedy to enforce such examination.

The Court ruled that it was unnecessary for him to argue his third point. The Supreme Court of the District of Columba has power to command the Commissioner of Patents to perform a duty enjoined by law—for it admitted of no controversy. Mr. Hayes replied for the Commissioner—contending that this was not a case for *mandamus*, for the examination was a judicial act; and that Whitely was not the proper person intended by law to have a re-issue; and that the refusal to examine was an executive decision of a preliminary question not examinable anywhere. The case was postponed for further consideration till Monday, 6th. Mr. Hayes, by permission of Court made a brief statement of points omitted on Saturday; and W. D. Davidge, Esq., further argued in behalf of the Commissioner.

Chief Justice Cartter, and Justice Wylie, sustained the motion; Justice Olin dissenting, because he had some doubt as to the right of a sectional assignee to a re-issue.

Sale of the Pirate Georgia.

Mitchell's *Steam Shipping Gazette*, of May 26th, says:—"Yesterday the miscellaneous stores belonging to the Confederate steam cruiser *Georgia* were disposed of by auction, at the Birkenhead Dock ware houses. The stores, which included 232 lots, consisted of provisions of various kinds, including tea and coffee, sugar, casks of rum, spices, tierces of beef and pork, bread, flour, peas, rice, oatmeal, cheese, preserved meats, pickles, clothing, etc., besides a large number of American ensigns, signal flags, and pennants, which had been taken from the several American ships seized by the Georgia. Several gentlemen from Liverpool, and also from Manchester, attended the sale, and the competition was spirited. Amongst the principal purchasers were Mr. James Livingston and Mr. Davis, of this town, and we understand the articles realized a considerable sum. The vessel herself is now advertised for sale, and the price put upon her by her present owners, it is stated, is upwards of £20,000.

The Gatling Gun used by Butler.

For the first time in this war, the Gatling gun was used by Butler in repelling one of Beauregard's midnight attacks. Dispatches state that it was very destructive, and rebel prisoners were very curious to know whether it was loaded all night and fired all day. We have the testimony of Mr. Mann, now in this city, the inventor and proprietor of the steel breech-loader made by Singer, Nimick & Co., as to its remarkable efficiency. Gatling, like Mann, has found it very difficult to get fair trials of his gun, and to have it introduced by the War Department, for the Government leaves all such things to the Ordnance Office, and that office is under the control of old fogies, who work by red tape, and who are slow to perceive the value of ordnance improvements, and still slower to introduce them into practice. The Indianapolis *Journal* says of this Gatling gun, as follows:—

"So far as we know this is the first time this formidable invention has ever had a chance to exhibit its power, though it has been tested and approved fifty times. No one who has seen it has doubt that in destructive energy it would prove equal to a regiment of men, and that its lightness and facility of handling would enable it to be used where a regiment could not be placed, and be moved with a rapidity that no regiment, not even of cavalry, could equal. It is hardly heavier than a wheelbarrow, a child can haul it, a single horse could trot off with a whole battery, its charge of cartridges can be renewed by loading on the field as quick as any other gun, it can fire as many shots in a minute as a whole regiment, it is simple of construction, impossible to be disordered, costs a trifle compared with other guns, and can be fired as accurately at as great a range as a Government rifle. In other words, it is a regiment of men put into half a dozen gun barrels and mounted on a light carriage. A half dozen in each brigade would cost little, and virtually double its destructive strength. Yet with all these obvious advantages, repeatedly declared by competent men, the Ordnance Office has utterly ignored it, just as it does every improvement in fire-arms."—*Pittsburgh Chronicle.*

The Madagascar Silkworm.

The "Bulletin de la Société d'Acclimitation," contains a curious paper on this subject, by M. Auguste Vinson, of La Réunion. He states that the Hovas weave a kind of silk which they call *landy;* and is obtained from the worm that feeds on the leaves of ambrevade, or Angola pea (*Cytisus Cajanus.*) This silk is heavy, and has no gloss, but is exceedingly strong. The natives sell the tissues they weave out of this silk very dear, and it is therefore only the rich who wear them. King Radama II., who dresses in the European fashion, wears trousers and a paletot made of this silk, which, not being dyed, is of a gray color, like unbleached linen. The wealthy are buried in shrouds made of this silk, and it is said that such shrouds entombed for centuries have been exhumed in a perfect state of preservation. The ambrevade being an indigenous plant of La Réunion, this Madagascar silkworm might be easily introduced there. The insect is forty-five millimetres long; its body is composed of twelve segments, and covered with black sharp horny points all over. The general hue is a chestnut-brown, but the abdomen has a longitudinal rose-colored streak between two other light brown ones. The cocoon is seventy millimetres in circumference, and forty-five in length; it is very heavy, of a dirty gray color, but interspersed with black bristles. The chrysalis contained in the cocoon is edible, and considered a delicacy by the Hovas, who eat it fried, as the Chinese do chrysalids.

Lighting by an Inverted Flame or Luminous Siphon.

We translate the following from *Les Mondes* (Paris):—

"M. Subra, Professor of Mathematics, has just invented a new mode of lighting by an inverted flame or luminous siphon, which is founded on the principle of the hydraulic siphon, the branches of which are turned up.

"If the air in the long limb of the siphon is heated, the rarefied air will rise. It will leave a vacuum which the denser air of the atmosphere will flow in to fill by the short limb, and a descending current will thus be formed. If, at this moment, a flame is lighted in the short limb, it will follow the current of air and will descend, while the products of combustion will remount the long limb, and will continue unceasingly to supply the siphon. The flame lighted in the long branch must be extinguished as soon as the current is established.

"The short limb of the siphon may be blown out in the form of a globe or a lantern. The long branch may be divided into several small branches, which will form the supports of the globe, or the mountings of the lantern, and which will unite in a single chimney. The chimney may terminate in the interior of the apartment or outside.

"The advantages of this new system of lighting are very important:—

"1st, The flame being descending, the tips and the supports of the globe are placed above it, and cannot intercept it below, nor spread any shadow downward.

"2d, The reflectors also of the globes and lanterns are placed behind the flame, and, therefore, cannot be blackened, and they turn toward the earth the luminous rays which would otherwise lose themselves in the air.

"3d, The gas is burned at a temperature more elevated by the concentrated heat of the siphon; its hydrogen is more more dilated, and its carbon more incandescent, in consequence its light is more developed and more vivid.

"4th, The combustion of the gas takes place in close vases, and the products of combustion are removed from the apartment by conducting pipes. Thus the gas emits no emanations, but on the contrary it burns the vitiated air, draws in fresh air, and ventilates the apartments at the same time that it lights them.

"The lighting by inverted flame may be applied very advantageously to the foot-lights of a theater. A row of foot-lights constructed after this system has just been tried in a hall of *l'Opera*. It has received the approbation of persons the most competent and the most distinguished.

"The light is twice as brilliant as the ordinary foot-light, and all danger of setting the dresses of the actors on fire is obviated. Preparations are being made for arranging the foot-lights of *l'Opera* house itself by this system."

Induration of Iron.

The iron work of the new bridge at Blackfriars is to be indurated by a process patented by Messrs. Morewood & Co., and is alike important from the great cost which will be incurred, and the testing of a rather abstruse chemical formula for the preservation of iron from oxidation and decay. The process is as follows:—"The iron is to be thoroughly cleaned, and heated to the requisite temperature in a furnace planned by the inventors. When this temperature is attained, it is to be plunged into a bath of prussite of potash and chloride of potassium, in a molten state, so that when the iron is withdrawn it may easily part with the surplus of the aforesaid chemicals, which should run off like oil. The iron is then to be dipped into boiling water, containing a certain proportion of cyanide of potassium; from thence it is removed to a bath for a final washing, and set up on end to dry. All the processes are to be carried on under cover, and before exposure to the atmosphere the iron is to be coated with an asphaltum paint twice, at given intervals; and again it is to receive two coats after fixing. Of course, all the necessary planing, drilling, and fitting is to be done preparatory to the indurating. The time the iron is to remain in the bath will vary from one to five minutes, according to the weight of the metal to be operated upon. The elaborate character of the process to which the contractor is rigidly bound, will account for the large sum to be expended in carrying out this part of the work; £4 per tun is allowed to the contractor for the induration and painting; Messrs. Morewood will receive from the contractors 5s. per tun as their royalty, which it is estimated will be £1,000. Thus £16,000 is to be spent in this effort to prevent oxidation, no greater proof of which, in its damaging results, can be offered than the case of the cleaning of the oxide (or rust) from the Menai Bridge, from which has lately been removed above 40 tuns of oxide of iron."—*London Mechanics' Magazine.*

Naval Prizes.—The following is a list of naval prizes up to the 1st of June, 1864:—Steamers, 232; schooners, 627; sloops, 159; barks, 29: brigs, 32; ships 15; yachts and small craft, 133. Total, 1,227. The aggregate value is $17,000,000, to be distributed among the naval captors.

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Improved Box-opener.

Persons engaged in active business operations have often experienced difficulty in wrenching off the covers of heavy cases. The nails hold with such tenacity that it seems as if nothing short of a crowbar would pry them up. The engraving published herewith represents a box-opener which is much the best one that we have ever seen. It is, in fact a powerful lever, the heel, A, of which constitutes the fulcrum, while the projecting flange, B, is the short arm. The power is applied as shown in the engraving, and the force exerted is irresistible by ordinary nails.

The instrument itself is made of metal, and has one edge of the flange, B (which projects at right angles from the main body), sharpened to an obtuse angle, so that it can be driven under the lid of a case, and thus obtain a hold for the lever. As the handle is forced down the lower edge holds on the wood and rends the two parts asunder. There is a series of ridges cut in the face of the projecting flange, so that it cannot slip, and a groove, C, is also provided to draw the loose nails after the cover has been forced open.

This box-opener is strong, effective, and a valuable adjunct in every store. It was patented on the 15th of March, 1864, through the Scientific American Patent Agency, by William M. Keague, of Brooklyn, N. Y. For further information address him at 397 Myrtle avenue, Brooklyn, N. Y.

Fig. 1.

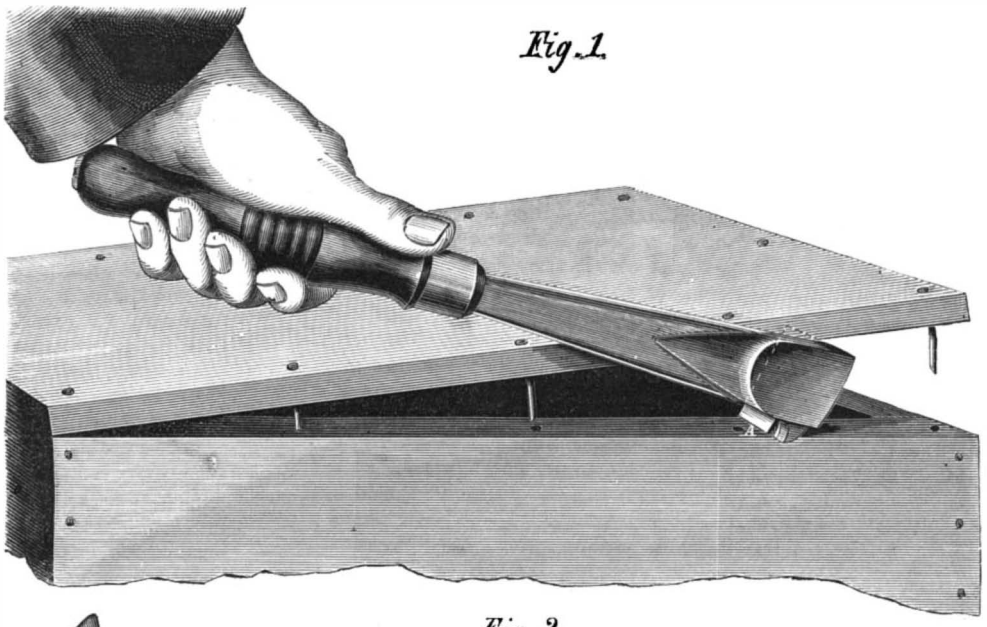
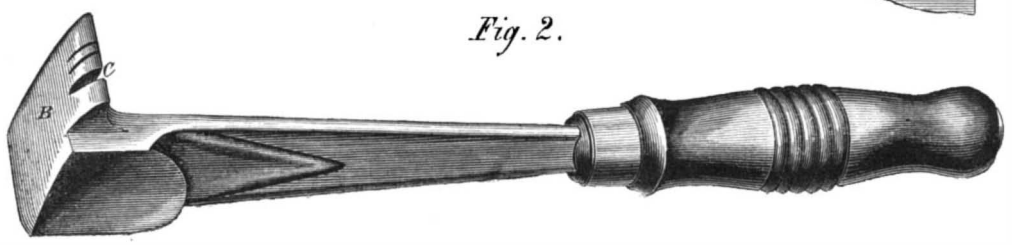


Fig. 2.



KEAGUE'S BOX-OPENER.

Improved Flour-packer.

The engravings published herewith represent a new flour-packing machine for which many advantages are claimed by the inventor. It consists of a stout frame, A, upon the upper part of which the operating machinery is placed. At the bottom there is a platform, B, on which the barrel to be filled rests. The flour is poured into the hopper. C, and from thence flows into the auger chamber, D, where there is an arrangement for delivering and compressing the flour in the barrel; this auger is worked by a pulley and bevel gears at the top. As the flour is packed into the barrel the same becomes heavier, and therefore some means must be employed to keep the pressure on the flour uniform, otherwise the barrel would run away from the auger or packer, and the work would be imperfectly done. To accomplish the object set forth, the platform on which the barrel rests has ropes connected to it which are wound upon the shaft, E, as shown in Fig. 1. When the packing commences the platform is in the position shown in Fig. 2; the auger, or packer, being at the bottom of the barrel, is not shown, because it would hide some parts of the machine. The flour is admitted to the barrel, and as the weight increases the platform descends; here it is that the arrangement we mentioned previously is useful. It is as follows:—The shaft, E, has a brake pulley, F, on one end, and a small pinion, G, outside of that, which works in a toothed quadrant, H. This quadrant has a slot in one side and a small rod, I, connected to a pin in the slot at one end, and to a weight on a lever, J, at the other. It is easy to see that when the shaft, E, the pinion, G, is on, descends by the gravity of the barrel and its load, the quadrant, H, will be moved by the pinion and push the weight, K, further out on the lever; this action increases the friction of the brake strap, L, on the pulley, and thus retards the descent just enough to perform the packing evenly throughout. When the barrel is to be removed the platform is in the position shown in Figs. 1 and 3, and it is brought back to its place for another operation by a weight attached to the cord over the pulley, M. There is also an arrangement at N, which retains the platform at the bottom of the frame, so that the full barrel can be taken off and another one put on; it is so adjusted as to be self-acting in its operations and can be set for barrels of any length when the machine is at work. The space occupied by the whole machinery is very small, only about two feet by three feet at the base, and eight feet high; it is also sold at a low price for the amount of work it does, and gives great satisfaction to those who use it. It is simple in its details, and not liable to derangement. With proper care the inventor says that it will not waste one quart of flour in a day's work.

This flour-packer was patented on the 26th of April, 1864, through the Scientific American Patent Agency, by Isaac Cook, of St. Louis, Mo.; for further information address the inventor as above, or A. K. Holteman, Jackson street, between Carrol and Soulard streets, St. Louis, Mo. States and county rights for sale.

Fig. 1.

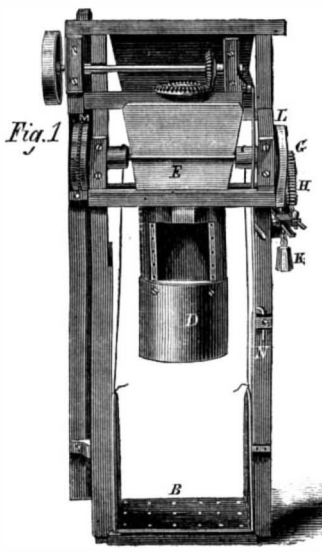


Fig. 2.

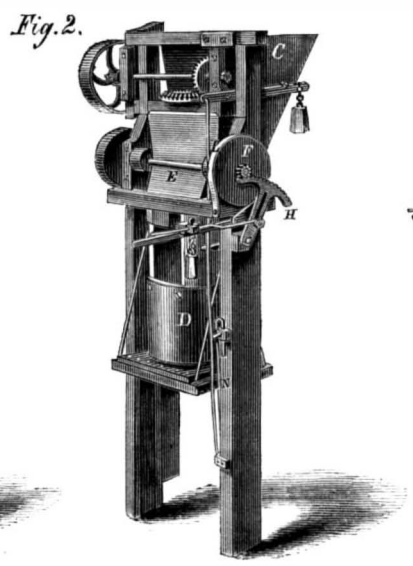
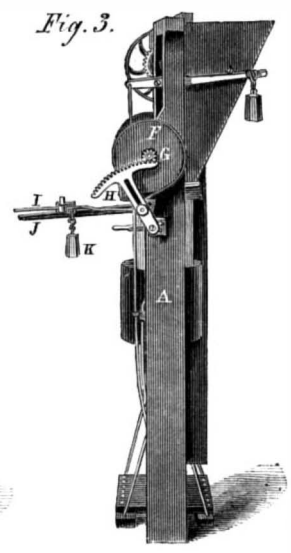


Fig. 3.



COOK'S FLOUR-PACKER.

Small Fire Balloons.

The material for making a small balloon should be a fine, thin, close-textured tissue-paper. Having determined that the balloon shall consist of a specific number of gores or sections, say 32 or 16, a pattern for cutting them by should be made of pasteboard or some tolerably hard substance. Suppose the entire hight of the balloon, without its appendages, is to be three feet, and the number of gores thirty-two, an elegant shape will be got by making the pattern an inch wide at one end, three inches at the other, and eight inches at its broadest part, which should be at one-third of its length, if the balloon is intended to have a pear-like figure. Varnish the gores with the ordinary boiled oil, and hang them up singly on lines till perfectly dry. They are next to be put together, which may be done with gum-water, or clean thin paste. After pasting or gumming about half an inch of one of the gores, lay the edge of another about midway across the part pasted, and then double over about a quarter of an inch of it, dabbing it lightly from end to end with a clean cloth, to insure its holding securely. Two of the gores being thus united, unite two others in like manner, and so on, until, if you had thirty-two gores in all, you reduce your number to sixteen. In like manner proceed till you make your number eight, then four and then two; hanging the sections up at every pasting so that they may get thoroughly dry as you proceed. The two halves are last of all to be connected in the same way; and this part of the undertaking is then completed. A circle of wire about six inches in diameter should be worked into the bottom of it, to keep the fabric of the balloon at a sufficient distance from the flame of the spirit. Another wire may be fixed across this circle to hold a piece of sponge, which should be immersed in spirits of wine. A smoldering piece of brown paper held underneath the aperture will, in a few minutes, put the balloon in an ascending condition. Having thus inflated the balloon, ignite the piece of sponge, and let it rise. When it is intended to inflate the balloon with hydrogen or coal gas, the latter apparatus is not needed; but a light car, or any other ornament proportioned to the ascending power of the balloon, may be appended to it, which will have the effect of maintaining it in the right position, and also of keeping it longer in sight.

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THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," agents 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. X. NO. 25....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JUNE 18, 1864.

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TO OUR READERS.

The present volume of the SCIENTIFIC AMERICAN, being the tenth of the new series, closes on the 25th of June, and we would remind all those whose subscriptions expire at that time, of the importance of promptly renewing them in order that they may not lose any of the numbers by delay. Our subscription list is now larger than at any period since the breaking-out of the war, and this in the face of the fact that many of our regular readers are now in the service of the country. To continue the interest in our journal we have spared neither time, exertion nor labor, and we think we may point to the three last volumes in support of the truth of this assertion.

The personal experience of the editors, and the frequent suggestion of useful ideas by correspondents, makes the SCIENTIFIC AMERICAN unequaled as a source of practical mechanical information. In its peculiar province this journal stands alone, and aims to be a faithful record of the genius, inventive talent and energy of the age we live in. From time to time we have published illustrated articles on tools and workshop economy, which have been most favorably received, and it is our intention to continue this subject in the ensuing volume. There is no other journal in the country which gives such full and specific information upon the enginery of war (frequently illustrated by diagrams received from official sources) as the SCIENTIFIC AMERICAN; in this respect the non-professional or general reader will find it of great interest. We need not enumerate special features, however, to convince our friends that we are working for their benefit, and endeavor to not only fulfill our contract, but to give good measure, heaped up and running over. We hope that all those whose subscriptions expire with this volume will not only renew them promptly but induce others to become subscribers also.

MAJOR GENERAL WINFIELD SCOTT HANCOCK, whose brilliant services in the army of General Grant have won so much praise—has been honored by the award of the army sword at the St. Louis Sanitary Fair. His competitor was General McClellan

FINISHING STEAM-ENGINE WORK.

Many persons in giving orders for steam engines expressly stipulate that no extra finish shall be put on them. The builders take advantage of this, and not being confined to polish certain parts, omit to finish any, and a rough, clumsy, and uncouth-looking engine is the result of their labors. The point taken by purchasers is that polish costs too much money, and after all adds nothing to the economic value of the engine. In some respects this is an erroneous view; radiation goes on rapidly from dead black surfaces, such as unpolished cylinders and their covers, steam chests, valve bonnets, and the like, while the reverse is true of bright parts. A loss of heat is experienced which is as certainly money as a bank bill. This is not the only evil effect. Unpolished surfaces make coarse-looking work, and are much harder to keep clean; grease runs down on them and burns in so that in time it is absolutely irremovable.

We are not arguing for the mere appearance of the steam engine when unfinished, for we feel that something more than externals suffer when such work is allowed to go out of the shop. The purchaser naturally and properly wishes to get the price he pays for his machine in radical improvements—those relating to a lessened consumption of fuel, better materials and workmanship; but we are very certain that if steam engine work could be polished handsomely and properly in a cheap way, we should hear of few orders for rough engines, except for special purposes. Polishing machines are wanted. We saw a man in a machine shop, the other day, lounging on a lathe and slowly grating off, with a stubby old tool, the scale from a cylinder cover; we could understand very well why finishing was costly. At the rate of procedure mentioned it would take a day to finish a plain cylinder head for a ten-inch cylinder, when it ought to be done by proper machines in two hours. There should be lathes made for the purpose. A rough cut should be run over and a finishing cut afterwards. The lathe should be so constructed that a scourer could be put in, oil and emery applied of different grades, and the work set in motion rapidly. The scourer should have an epicycloidal motion, or one resembling the curves teeth of gears describe when leaving each other. In a short time, without superintendence, other than that of an apprentice, a finish would be imparted that no hand-work could approach. When we say *lathe*, we mean a machine resembling it, the details must be worked out by those interested.

There is no reason why automatic machines for polishing cylinder heads, or circular metal work of any kind, should not be invented and introduced. For flat surfaces, such as steam chest covers or slide bars, we have the emery wheel. When properly handled, work done by it is of the first quality, and only requires a little brushing up with emery paper afterward to look better than hand work. We are confident that many hundred dollars may be annually saved in machine shops by the use of such tools as we have adverted to in this article.

A GOOD THING TO BREATHE.

The great mass of the inhabitants of the Northern United States live in better houses, wear better clothes, and eat better food than the mass of any other nation, but they breathe the worst air of any people in the world. They like bad air. Every man chooses to have his clothes and food prepared fresh and new for himself, but he likes to have his air breathed over a few times by his neighbors before he takes it into his own lungs. In this process its oxygen is diminished, its carbonic acid is increased, it gets a little warm, and moist, and dirty, and then it just suits the American taste.

All through the winter months our city railroad cars are literally packed with passengers, and the doors, windows and ventilators are kept tightly closed. If any passenger ventures to open one of the little narrow ventilators in the upper part of the car, some very nice gentleman, with a clean collar, white teeth, and a carefully-dressed wig, who is drawing in at every breath quarts of air loaded with tobacco fumes, and animal matter from the lungs of his fellow passengers, is sure to give a shiver, and request that the minute opening may be closed.

In our churches the congregations generally have air in the forenoon which is quite tolerable, but in the afternoon their consciences and good manners are subjected to a constant strain in efforts to resist the stupefying effects of the noxious gases with which the church has become filled during the morning service.

But the worst effect of this national predelection is seen in our schools. Hundreds of little boys and girls are confined in close rooms for three hours at a time, breathing over and over again the same air, constantly diminishing its oxygen which is the supporter of life, thus reducing the force of the vital functions; while at the same time the brain, that inevitably shares the enervating influence, is stimulated by the most exciting ambition to exertions too great for even its undiminished strength. By this course hundreds of helpless children, each the pride and joy of its home, have been doomed to lingering disease and early death.

There is no necessity for breathing poisonous gases. We are placed in a great ocean of air which has been prepared by nature in just the proper proportions of oxygen, nitrogen and watery vapor to adapt it to the structure of our lungs and the healthful action of all our organs. We know that by breathing constantly this atmosphere, taking a fresh and pure supply at every breath, our physical system will attain to the highest degree of health and strength of which it is capable. It is only by laborious effort that we can box ourselves in, so that we can obtain the foul air of which we are so fond.

There may be, however, a few persons in the community who prefer fresh and pure air to that which has been breathed over a number of times. To these we commend Dr. Reid's work on ventilation recently republished by John Wiley, 535 Broadway, New York. It is a small book of 120 pages, and discusses the subject with an intelligence which is the result of a long series of investigations. The various methods of bringing in and distributing the fresh air, and of removing the noxious gases, are treated with a rare combination of profound scientific knowledge and practical common sense.

THE THEORY OF BOILER EXPLOSIONS FROM THE DECOMPOSITION OF WATER.

Among those who are wedded to the opinion that the explosions of steam boilers are generally produced by some mysterious force, a very favorite theory is that of the decomposition of water. It is well known that when steam is brought in contact with red-hot iron, it is decomposed, the oxygen entering the iron to form oxide of iron, and the hydrogen being set free as a gas. It is also well known that when hydrogen and oxygen gases are mixed together in the proportion of 8 lbs. of oxygen to one of hydrogen, and set on fire, an explosion results. It has been argued by some very intelligent writers that these operations take place in steam boilers, and are the most common cause of explosions.

There is no doubt that if a portion of a steam boiler becomes red hot, and steam is then brought in contact with it, the steam will be decomposed; the oxygen of the steam combining with the iron, and the hydrogen being set free. But the quantity of water thus decomposed in a steam boiler must be very limited. The oxide of iron which is formed in this case is the magnetic oxide, in which 3 atoms of iron combine with 4 of oxygen, $Fe_3 O_4$. As the atom of iron weighs 28 and the atom of oxygen 8, the proportions are 84 lbs. of iron to 32 of oxygen, or 21 of iron to 8 of oxygen. As 8 lbs. of oxygen combine with 1 of hydrogen to form water, it follows that 21 lbs. of iron will be oxidized to produce 1 lb. of hydrogen gas. This whole 21 lbs. must be upon the surface, for as soon as a thin scale of oxide is formed it becomes a protecting coating to the metal beneath, and prevents further action.

If the 1 lb. of hydrogen is mixed with 8 lbs. of oxygen, and set on fire, the two elements will immediately combine to form 9 lbs. of water, and the amount of heat generated by the combustion will be sufficient to raise the temperature of 1 lb. of water 42,480 degrees, or to raise the temperature of the 9 lbs. 4,720 degrees. Consequently, the water would be in the condition of very highly superheated steam Though it is uncertain whether at this high tempera ture steam expands in the same ratio that it does a the lower temperatures and pressures which are mor easily measured, there can be little doubt that th

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pressure would be sufficient to burst any ordinary boiler, provided the whole steam space of the boiler could be filled with the two gases in the proper proportion, and the gases could then be set on fire. But in practice this could never occur, nor indeed could any mixture and burning take place sufficient to produce an explosion.

In the first place, all of the oxygen taken from the water would be combined with the iron, where it would remain permanently fixed. It is true that oxygen is absorbed by water in small quantities from the atmosphere, and is forced into the boiler with the water. The first action of the heat upon the water is to expel this oxygen, together with the nitrogen, carbonic acid, and other gases which the water holds in solution, and if the oxygen remained in the steam space it might be mixed with any hydrogen set free by the decomposition of the water. But the oxygen does not remain in the steam space; it is constantly being drawn off with the steam, and worked through the cylinder. The hydrogen too, as it is set free, being the lightest of all gases, must rise instantly to the highest portion of the boiler, and pass at once into the cylinder.

Even should the engine be at rest, the two gases would be so mingled with the steam and with carbonic acid gas expelled from the water, that they would not burn if fire was applied to them. This objection is fatal to the theory. In consequence of the large proportion of steam in the mixture, no explosive compound of gases can ever be found in the interior of a steam boiler.

REBEL IRON-CLADS.

Upon the occasion of every petty success of the nondescript rebel craft, known as "iron-clads," certain portions of the press have deemed it incumbent upon them to deride our own vessels of this class, and to soundly berate their qualifications, and all concerned in their construction or management. We are told that with the small means at their command the rebels have built and put in commission some terrible ships, which have achieved far greater results than our own vessels.

The truth of the matter is that the rebel iron-plated vessels are of no value whatever, except to furnish a pretext for the enemies of the Government to deride and cripple its efforts to subdue the rebellion. They are not for all time, but for a day, and a short one at that. They are reported in telegrams as about to emerge from their fastenings to sink, burn, and destroy; but when the time arrives an unavoidable postponement occurs. Perhaps after much vaporing they do venture to attack some half-armed gunboat, or transport, and having drowned some dozen men, or fired a shot through some tug's boiler, which the exigencies of the service have transformed into a gunboat, we read bombastic reports of their achievements.

Those familiar with facts, and willing to place them on record, know full well that from the advent of the *Merrimac*, down to the disappearance of the last one, the *Albemarle*, their triumphs have been as short-lived as their existence. The vessels which survived the shock of battle are moored peacefully in sluggish waters. The South-western rebel iron-clads, *Arkansas*, *Louisiana*, *Mississippi*, and "*Hollins' Ram*," are no more. Those nearer home are, with but few exceptions, also destroyed. And one of the latest conceptions of the rebels—the *North Carolina*—is hoist by her own petard; or in other words, broken in two by her own weight. Three of these terrible Confederate ships-of-war lie beyond the obstructions on the James river, at Fort Darling; their tremendous offensive power is reserved, we suppose, for the defense of Richmond, for up to this time they have not "offered the gage of battle," as being run down and sunk by our vessels is magniloquently called by the rebels. Their time will come, as all the others have, and we hope that we shall soon cease to read reports of the "immense smoke," etc., these iron-plated ships make when coming down to annihilate Union gunboats.

PRESERVING MEAT.

From the present indications there is little room for doubt that the practice of preserving meat by immersing it in liquid brine will soon be superseded by better methods. All physiologists and chemists who have examined the subject are agreeing in the opinion that scurvy and other diseases which result from the exclusive use of salted meats, are not caused by the presence of salt or saltpetre, but by the absence of potash, phosphoric acid, and other nutritious substances which are dissolved and removed by the brine.

This discovery is leading to practical results in two directions. On page 309, of our current volume, we published a description of the process recently patented by Mr. Alexander Whitelaw, of Glasgow, Scotland, for recovering from the brine the nutritious portions of the meat dissolved in the liquid. The account stated that each gallon of brine will make as much soup of a given strength as seven pounds of beef. As the soup thus prepared would contain the very substances removed from the meat by the brine, it is probable that its use on shipboard would obviate all danger of scurvy.

By far the most important application of the discovery, however, is in the adoption of plans for preserving meat without immersing it in brine, by which means all the nutritive portions of the meat would be left in it. In our last number we gave an account of the boldest and most novel of these plans proposed by Prof. Morgan, of Dublin. This plan is to fill the blood-vessels of the animal, immediately after death, with just enough brine and sugar to preserve the meat, the brine remaining in the meat, by which the removal of any constituents is avoided.

Another plan which has long been practiced is to pack the meat in dry salt. The sweetest and best bacon that we ever saw was cured in this manner. It is doubtful, however, whether meat thus treated is as certain to keep as that which is immersed in brine, especially if the hams or pieces are large.

The advantages of Prof. Morgan's method are so great and so numerous that we hope it will be subjected to an early and thorough trial by some of our farmers and butchers, and we trust that some of them will be sufficiently public-spirited to give the community the benefit of their experience through the columns of the Scientific American.

LARGE AND SMALL STRAWBERRIES.

Nothing is more surprising than the persistence of farmers and gardeners about New York in cultivating small varieties of strawberries. If the plants of large varieties were held at high prices, or if it was difficult to cultivate them, or if the yield was small, there would be some reason in the practice. But the truth is that enough plants of Hovey's Seedling may be bought for a dollar to cover an acre of ground the second year; the large varieties grow more vigorously and are cultivated more easily than the small; and the yield is from two to four times as great; while the principal portion of the labor, that of picking, is not one-quarter as much with the large varieties as with the small. In face of these facts the gardeners in this vicinity continue to raise small crops of little berries which bring six cents per basket in market, when they might with less labor raise large crops that would sell for twelve cents per basket.

THE YACHT CLUB REGATTA.

The New York Yacht Club celebrated its annual regatta on the 3d instant. The number of vessels was not so great as on the last regatta, but the weather was more propitious, and, taken as a whole, much more favorable. For a wonder a breeze sprang up before the yachts had drifted half the length of the course, and ere Jersey City had been passed the sharp little clippers were showing their heels to each other in a handsome manner. The bellying sails distended like the cheeks of Boreas, the whips and streamers unfurled from the committee-boat, the steamer *Matteawan*, the seething bubbles sparkling in the wakes of the black hulls, the invigorating breeze, and the anticipation of an exciting race, gave promise of a pleasant day that was not destroyed subsequently. There is nothing to be said, except in praise of the regatta itself; wind and weather alike have our compliments for the success of their efforts to make things agreeable. As for the tide we "pass no remarks;" it is always contrary and obstinate; it not only waits for no man, but comes and goes as it chooses. On this occasion it behaved tolerably well. The yachts entered were the *Alarm*, *Nautilus*, *Narragansett*, *Richmond*, *Annie*, *Plover*, *Julia*, *Nettle*, *Geraldine*, *White Wing*, *Juniata*, *Magic*; of these three were withdrawn, the *Alarm*, *Nautilus*, and *Plover*. We cannot give the time of the yachts in detail; it is sufficient to say that the *Annie* was the winning boat; the *Magic* came next, and the *Narragansett* after her. The *Magic* in reality was the fastest sailor, and if she had had a little stronger breeze would have distanced her antagonist, the *Annie*. The *Magic* started last from the Elysian fields but ceme in second at the final state. The stretch home was most exciting, and could only be compared to a flock of white winged birds in rapid flight; as the yachts rounded the state boat at the southwest spit, they spread all sail and bowled along homeward followed by the good wishes of all the spectators.

STEAM EXPERIMENTS.

Before proceeding with a history of the experiments of Hecker & Waterman, we will state more fully what it is that is sought to be ascertained by them. In the experiments by the same men, made in 1860, it was found that when the steam was cut off at one quarter of the stroke in an unjacketed cylinder, 66 per cent of the steam formed in the boiler was condensed in the cylinder; and when both the cylinder and valve-chest were immersed in steam of the boiler temperature, 30 per cent of the steam was condensed in the cylinder.

The process by which this large amount of condensation takes place is supposed to be this. When the steam is cut off and begins to expand, a portion of its heat is consumed in the performance of work; or, if the expression is preferred, it is cooled by expanding. This cooling causes a portion of the steam to be condensed into water, which is deposited in a fine dew all over the inner surface of the cylinder. It will be borne in mind that this condensation takes place under pressure. There is not heat enough in the cylinder to keep all of the water evaporated under the pressure that is actually exerted.

When the piston has finished its stroke the exhaust port is opened, and the pressure upon the water clinging to the interior surface of the cylinder—the pressure that held it in the liquid state—is removed, and this water immediately flashes into steam. In this change a portion of the heat required to convert the steam into water is absorbed from the walls of the cylinder, thus cooling the walls, and preparing them to repeat the process of condensation at the next stroke.

The proof of this condensation is found in the indicator cards, where the line of pressure falls below, not merely the curve of the Marriotte law, but also below this curve when corrected for the heat consumed in the performance of work. And that the same process takes place in engines generally may be learned by a careful examination of the numerous cards taken from those engines.

It will be observed that the condensation takes place on the steam side of the piston and thus diminishes the working pressure, while the re-evaporation occurs when the exhaust port is open, and when the steam formed in the cylinder, if it exerts any pressure at all, exerts a back pressure on the piston. Thus the condensation and the re-evaporation are both injurious in their operation.

It is manifest that if the inner surface of the walls of the cylinder could be kept sufficiently heated, no water could be deposited upon them, and thus this process of condensation and re-evaporation would be prevented. The plan devised by Mr. Waterman to keep the inner surface of the cylinder hot, is to make the walls very thin, and to surround them with steam of the boiler temperature. In the experimental engine the walls are of steel one-tenth of an inch in thickness, and the engine is being tried first with hot steam around the cylinder, and then under the same conditions with only a jacket of confined air.

Admiral Lee has organized a torpedo and picket division for clearing the banks of the James river of torpedoes. The division consists of three gunboats, seven armed boats and 150 men, and precedes the fleet in its advance up the river. They have already secured eleven infernal machines, four of which contained twelve hundred pounds, and one contained two thousand pounds of powder. They are all very dangerous and powerful torpedoes.

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THE OLDEST FAMILY—ITS GROWTH AND DECLINE.

The vast multitude of facts which have been collected by the students of geology have developed the general law, that each family and species of animals made its first appearance on the earth in individuals few in numbers and small in size; it gradually increased both in size and numbers, till it attained its maximum, and then through long ages it slowly and gradually declined.

In making the soundings for the Atlantic telegraph between Newfoundland and Ireland a small tube with a valve was fitted to the end of the line, so as to bring up a little of the sediment from the bottom of the sea, and when this was dried it was found to be a dust so fine that on rubbing it between the fingers it would disappear in the cracks of the skin. On placing this dust under a microscope each particle was seen to be a shell—the home of a sentient being. When these shells are highly magnified little ho es are discovered in them through which delicate filaments protruded that were the animal's organs of locomotion. As these filaments branch out like the roots of a tree, the animal is called a rhizopod, from two Greek words which signify root-footed.

As the rhizopod is the simplest form of animal life it is probably the oldest. The shells are found in all of the geologic periods, and as we go down in the strata, or backward in the ages, they regularly increase in size and numbers. They form a large portion of the chalk formation which was laid down in the age of reptiles, and at that time the shells were generally of about the size of a pin's head; in lower strata the shells are found as large as a penny, and in still lower a foot in diameter.

By a communication on another page from the geologist, Dr. Stevens, it will be seen that the Canadian geologists have found the remains of rhizopods in unstratified granite, a rock heretofore supposed to be destitute of organic remains. These rhizopod shells in granite are three feet in diameter. Thus it is proved that the seas were swarming with life in that remote time when the oldest formation was hardened into rock. And at that time the rhizopods had reached their maximum development. Unless this family forms an exception to the general law of animal life, it must have been growing through unmeasured ages before the time when the hardening granite first enfolded the gigantic remains in their everlasting tomb.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the pat entee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. II., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JUNE 7, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

42,999.—Piston Packing.—J. Randolph Abbe, Providence, R. I.:

I claim the combination of the screws, b b, or their equivalents, the screws, e e, having wedge-shaped heads, the toothed nuts, f f, toothed ring, F, toothed gear, G, and spindle, i, the whole applied to operate substantially as and for the purpose herein specified.

[This invention consists in a novel and very effective manner of setting out or adjusting the packing of a piston, whereby the necessity for removing the follower or any portion of the piston or of the cylinder head, for that purpose, is obviated.]

43,000.—Oil Cup.—E. W. Bancroft, Columbus, Ohio:

I claim the tube with the small perforation at the top, by means of which the oil is gradually fed to the machinery, substantially as shown and described.

43,001.—Planing Machine.—Alonzo T. Boon and John Collins, Galesburg, Ill.:

In a machine for planing, sawing, boring, and cornering, we claim the combination of the adjustable side table, with the adjustable jaws or gage bars, as constructed and arranged, when used in combination with the planing-knife, saw and boring-bit, as arranged on one end of the driving-shaft in the frame, for the purposes above-mentioned, and as herein-described and set forth.

43,002.—Bathing Tubs.—Alfred Brady, New York City:

I claim the construction, combination and arrangement of the overflow channel, the waste hole and waste-pipe, as described in the above specification, the overflow channel being placed on the inside of the tub so as to bring the overflow channel over part of the waste hole and waste pipe, thereby forming one straight and continuous channel from the top of the overflow channel into the waste pipe, the opening in the top of the overflow channel being sufficiently large for removing obstructions in the overflow channel or waste pipe, all as shown and described.

43,003.—Furnace for calcining Ores.—J. B. Britton, Philadelphia, Pa.:

I claim, first, A calcining furnace, having a fire-place, F, communicating with a chamber, D, and with a flue for carrying off the products of combustion, so that the latter must pass across the said chamber to the said flue, substantially as and for the purpose described.

Second, The box, K, or its equivalent, arranged below the chamber, D, in combination with the appliances herein described, or any equivalent to the same, whereby the said box is caused to discharge masses of calcined ore, as set forth.

43,004.—Husking-pin.—Frank Brown, Russel, Ohio:

I claim the herein-described husking-pin, when constructed substantially as set forth.

43,005.—Machine for grinding File Blanks.—James S. Brown, Pawtucket, R. I.:

I claim the combination of the two series of arms, r r s s, or their mechanical equivalents, and their adjustable centers or rods, u v, provided with adjustments, as described, with the file blank carrier, C, arranged and so as to operate with a grinding wheel or stone, substantially in manner as specified.

I also claim the combination of the file carrier and its adjustable arms and centers, having adjusting devices as explained, with the carriage, D, provided with devices for moving or adjusting it, substantially as explained.

43,006.—Metallic Bath Furnace.—James S. Brown, Pawtucket, R. I.:

I claim the improved metallic bath furnace, or combination and arrangement of one or more fire-places, A B, a bath-pot chamber, D, a bridge, F, a flue passage, e, and an escape flue, l, the whole being connected in manner, and so as to operate substantially as specified.

43,007.—Rake for Harvesters.—O. H. Burdick, Auburn, N. Y.:

I claim, first, In combination with a rising and falling rake, a spring that is mechanically compressed and relaxed, to hold the rake to the platform, and to release it when it is to be raised up, substantially as described.

I also claim the combination of the cam and pin, c d, on the gear, C, with the cam and slot, i i, on the rake plate, for procuring an easy traverse, and rising and falling motion to the rake, as described.

I also claim a rake plate constructed with a cam, a slot, and an adjustment for the rake, so that, whilst the rake may be set more towards or from the grain, the cam and slot may continue to work with their co-operative parts without interruption, substantially as described.

I also claim, in combination with a clutch, the spring-bolt, k, and the tail-piece, j, so that the rake may throw itself out of action at the end of every stroke, or be continued in action at the will of the driver or conductor, substantially as described.

43,008.—Tool for making Metallic Sashes.—Andrew J. Campbell, New York City:

I claim a tool or implement for covering with sheet metal the rails or bars of sashes, composed of a series of wooden blocks and metal plates provided with holes, and arranged substantially as described.

[This invention relates to a new and useful tool for covering with sheet metal the wooden bars or rails of sashes, such as are used for show-cases and for similar purposes.]

43,009.—Artificial Gum and Palate.—John A. Cummings, Boston, Mass.:

I claim forming the palate and gums in which the teeth are inserted in one piece of hard rubber or vulcanite, i e, an elastic material which can be hardened sufficiently for the purpose of mastication and retain a portion of its elasticity so as to yield a little to the motion of the mouth, as herein set forth and for the purposes specified.

43,010.—Railroad Car-brakes.—John Davis, Alleghany City, Pa. Ante-dated Jan. 2, 1864:

I claim the use of rods, j k l and m, levers, h and x, springs, 2, and catch, y, or their equivalents, when used in combination with brakes, which are operated substantially in the manner herein described and for the purpose set forth.

43,011.—Washing Machine.—Jacob Dodder, Washington, Iowa:

I claim the S-shaped line, i, on the interior surface, for subjecting the clothes to the greatest pressure at the extreme throw of the crank, in combination with beaters that are operated by the adjustable connecting rods.

43,012.—Washing Machine.—J. H. Fellows, Belvidere, Ill.:

I claim the projections, d d', formed of a single central ring or bead, 1, with conical ends, 2, divided longitudinally and centrally, but this I only claim when the said projections are arranged on the bottom, c, and rubber, E, in the particular manner represented, and used in combination with the stand, B, frame, D d, arbor, C a, and key, D', all as shown and described.

[This invention consists in the employmentor use of projectors of a peculiar shape applied to the bottom of the tub, and to the under or base side of the rubber, in such a manner as to combine the rubbing and compressing principles, and ensure a perfect cleansing of the clothes without injuring them in the least.]

43,013.—Tanning Hides and Skins.—William Fields and Isreal Townsend, Wilmington, Del.:

I claim, first, The employment or use, in tanning hides and skins, of a current of compressed air applied to the hides or skins, in combination with the ordinary tanning liquor, in the manner and for the purpose substantially as specified.

Second, The perforated pipe, E, extending through the air-tight vat, A, near its bottom, in combination with an air-pump and loaded valve, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the employment or use, for the purpose of tanning hides or skins, of a current of air applied to said hides or skins, under a pressure of from five to twenty or more pounds, acting in combination with the ordinary tanning liquor in such a manner that the compressed air is caused to circulate through the liquid, and, by its action, the tanning liquor is forced into the hides or skins, and at the same time, by the motion of the air in the vat, the hides are constantly brought in contact with fresh air, and the handling of the hides and all the labor connected therewith can be saved.]

43,014.—Galvanic Batteries.—George W. Freed, Lancaster, Pa.:

I claim the vessel, C, with its grooves, z p z, in each end, bottom ledge and end holes, c, when constructed in the manner and for the purpose specified.

I claim projecting points, z p z, on the plates, each plate set separately in its groove, in combination with the cap, B, made of gutta percha, or its equivalent, applied in the manner and for the purpose specified.

I claim the cover or lid, A, with its one or two pair of screw taps, p l z l, and p 2 z 2, and perforations for the plate points, p, and z z, the latter pair connected by a band above, and wire beneath, which points come in contact with the metallic rings and connected with their respective screw taps, as shown, all arranged substantially in the manner specified.

I also claim the covering or cap, B, made of gutta percha, or its equivalent, substantially in the manner and for the purpose specified.

43,015.—Preparing Short-staple Fiber from Hemp, Flax, etc.—Jim B. Fuller & James P. Upham, Claremont, N. H.:

We claim, first, Preparing the fibers of flax, hemp, and other simillar substances for "cottonizing" or rendering applicable to short staple textile fabrics, by subjecting such substances, while in the vessel in which they were boiled or cured, with water or other liquids used for softening or dissolving the gummy and coloring matter in such substances, to the action of a piston, plunger or follower, or equivalent device, so arranged as to press the fiber into a solid compact mass in one part of the curing vessel, at the same time pressing out of the mass all or nearly all the dissolved gummy and coloring matter while such gummy and coloring matter is in a dissolved or softened condition, so that it can be readily drawn off, while the fiber is contained in the curing vessel, substantially as and for the purposes specified.

Second, We claim washing the cured fiber by the combined action of the piston, C, or its equivalent, and of water, in the manner substantially as specified and for the purposes set forth.

43,016.—Method of suspending Steam Boilers.—C. O. Ganse & S. N. Jordan, Osawatomie, Kansas:

We claim, first, The springs, R R R R, the ropes or chains, M M M M, and the pulleys, N N, in combination with the boiler, substantially as and for the purpose set forth.

Second, The spiral springs, T T, in combination with the boiler or chamber, B, as described and shown.

43,017.—Attaching Sabots to Spherical Projectiles for Ordnance.—George P. Ganster, New York City:

I claim a sabot, B, having a concave face, d, and aperture, c, in combination with a spherical shell, A, having a screw threaded teat, b, projecting from its rear side, when the said screw threaded teat serves to securely attach the shell to the sabot, and all the parts are constructed, arranged, and employed in the manner and for the purposes herein specified.

43,018.—Lathing for Walls and Ceilings.—D. D. Garland, Kewannee, Wis.:

I claim an improved lathing for walls and ceilings constructed of boards or pieces sawed of a proper thickness from any suitable timber and slotted longitudinally, substantially as herein shown and described.

[This invention consists in having boards sawed from any suitable timber of a thickness about equal to that of ordinary laths, and having said boards or pieces of the same slotted longitudinally nearly their whole length, the spaces between the slots being about equal in width to an ordinary lath, whereby several advantages are obtained over the ordinary laths.]

43,019.—Spring Brace and Clip for Carriages.—E. J. Green, Valparaiso, Ind.:

I claim, first, In combination with the bow-shaped brace, E, secured as herein described, the guide rod, G, and guide plate, f, for keeping the spring in a vertical position as it plays under its superincumbent load, substantially as described.

Second, I also claim in combination with the brace and the guide rod, the clip plates, H I, for securely fastening the spring to the head block, substantially as described.

43,020.—Washing Machine.—Chauncey H. Hale, Fayetteville, N. Y.:

I claim the construction of the adjustable elliptic spring, D, adustable arms, L, and adjustable screw rod, M, when arranged and combined as herein described, and for the purposes set forth.

43,021.—Explosive Compound.—Halvor Halvorson, Cambridge, Mass.:

I claim the combination of an organic sulphide and a cyanide or ferrid cyanide with an organic deflagrating ammoniacal salt and a chloric or per-chloric salts of potassa and ammonia, as and for the purposes described.

43,022.—Compound of Cyanogen and Iron.—Halvor Halvorson, Cambridge, Mass.:

I claim the compound of cyanogen and iron, herein set forth.

43,023.—Sheep Rack.—R. Hart, Savanna, Ohio:

I claim the herein described sheep rack, composed of the hinged sections, A B, the troughs, C C, standard, D, and cam, E, when these several parts are constructed, arranged, and combined in the manner and for the purpose herein set forth.

43,024.—Heel for Boots and Shoes.—C. H. Helms, Poughkeepsie, N. Y.:

I claim, first, The employment or use of the cutter wheel, C, in connection with the guards, E F, either or both, substantially as and for the purpose set forth.

Second, Providing the cutters, D, with throats, b, arranged as shown, in connection with the space, j, between the guard, F, and the outer side of the cutter wheel, C, to admit of the free escape of the heel shavings, as described.

43,025.—Coating Barrels to render them Oil-tight.—Albert H. Hook & J. Henry Darlington, New York City;

We claim saturating wooden vessels, as and for the purposes herein-above set forth.

We also claim in combination therewith the manner of stopping the bung-hole.

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43,026.—Grain Separator.—Aaron Higley, Chicago, Ill.:

I claim, first, The adjustable deflector gage, m, in combination with the gage, h, and receiving box, k, substantially as and for the purpose set forth.

Second, I claim the arrangement and combination of the pinion, d, gear wheel, b, the connecting rods, b′ and d, rock shafts, b″ and c, for the purpose set forth.

Third, I claim the trough, D, in combination with the screen, 4′, and apron, E, arranged and operating as and for the purpose specified.

Fourth, I claim the slide, G, screens, 2 and 3, in combination with the spouts, I and J, as and for the purpose set forth.

Fifth, I claim the vibrating rake, a″, when attached to either the upper or lower shoes and used in combination with the separator, substantially as set forth.

43,027.—Projectiles for Rifled Ordnance.—B. B. Hotchkiss, New York City:

I claim, first, In rifle cannon projectiles the recesses, A2 B2, in the rigid portion or portions, arranged relatively to grooves, D, on the exterior of the expansive packing, C, as indicated, the recesses in the rigid material being arranged opposite or under the grooves in the expansive material, in the manner and for the purposes herein set forth.

Second, I claim the within described form and arrangement of the parts, A A1 A2 B B1 B2 C and D, whereby the recesses, A2 B2, alternate between wedge-like portions, A′ B′, near the front and rear edges of the belt of soft material, C, as and for the purpose specified.

43,028.—Bonnet.—Frank Howard, Somerville, Mass.:

I claim, as a new article of manufacture, a lady's hat or bonnet frosted, substantially as and for the purpose described.

43,029.—Explosive Projectile for Ordnance.—Job Johnson, Brooklyn, N. Y.:

I claim the screw plug, f, formed with the cavity at the front, and receiving the detonating cap on the end of the rod, q, for the purposes and as specified.

I also claim a plug or plate of steel forming a facing or surface to the softer metal of the plug, f, for the purposes and as specified.

43,030.—Animal Trap.—Alexander Kinkead, Watertown, Ohio:

I claim the combination and arrangement of the shutter, B, with the treadle lever, C, as shown and described, for the purposes set forth.

43,031.—Artificial Leg.—Gustavus Christian Kirschmann, New York City:

I claim, first, The globe-shaped projection, A′, uniting the two parts of the shell, A, as and for the purpose shown and described.

Second, The oval or eccentric fulcrum pin, c, of the knee joint, as and for the purpose described.

Third, The combination of the tubes, D and E, with the screw rods, a and d, and shell, A, as and for the purpose set forth.

Fourth, The small tubes, e* e′* in combination with the tube, E, rod, d, and shell, A, as and for the purpose specified.

Fifth, The arms, e e′, provided with guide rollers, f, in combination with the tube, E, and ropes, H H′ L L′, as and for the purpose described.

Sixth, The sleeves, F F′, in combination with the springs, G G′, tubes, D E, and rods, a d, as and for the purpose set forth.

Seventh, The ropes, H H, in combination with the sleeves, F F′, and springs, G G′, constructed and operating substantially as and for the purpose shown and described.

Eighth, The spring, a*, attached to the shell, A, in combination with the spring, G, of the knee joint, as set forth.

Ninth, The disk, E*, provided with flanges, e3, in combination with the tube, E, and shell, A, as and for the purpose specified.

Tenth, The set screw, j, in combination with the spring, J J*, and ankle joint, I, constructed and operating substantially as and for the purpose set forth.

Eleventh, The rope, L, in combination with the toe piece, K, sleeve, F, rope, H, and springs, G G′, all constructed and operating substantially as and for the purpose described.

Twelfth, The rope, L′, in combination with the spring sole, K′, and toe piece, K, as and for the purpose specified.

Thirteenth, The cross bar, 12. in combination with the toes, K*, and ropes, L L′, constructed and operating as and for the purpose specified.

43,032.—Wire Fence.—Isaac Knapp, Medina, N. Y.:

I claim the perpendicular cleats suspended to the wires of the fence with the base board attached thereto, which will at all times keep the wires of the fence at a suitable tension by rising and falling with the contraction and expansion of the wires as they are affected by the weather.

43,033.—Mode of Lubricating Car Axles.—B. J. La Mothe, New York City:

I claim a reservoir for lubricating material within the axle or shaft and supplying such lubricating material to the bearing through holes, in the manner and for the purposes specified.

43,034.—Solution of Anotta.—Alexander Macphail, Jersey City, N. J.:

I claim the solution of anotta obtained by a process, substantially as herein specified.

[Anotta in the condition in which it is ordinarily found in the retail market is much adulterated with red-lead, and other more or less poisonous or otherwise injurious matter. The principal object of this invention is to obtain the coloring principle of this substance (orelline) in a pure state and in a suitable form for giving to butter and cheese the rich yellow tint so much desired, for which purpose it has, owing to its entirely innocuous character, long been extensively used in this and other countries.]

43,035.—Lock and Latch.—Burton Mallory, New Haven, Mass.:

I claim the combination of a lock and latch, when the catch-bolt and its operative mechanism are arranged in a case or frame independent of the main case, and constructed so that the latch bolt may be secured, substantially as described, without removing the said independent case from the main case.

43,036.—Surveyor's Compass.—Horace B. Martin, Santa Rosa, Cal.:

I claim the movable graduated plate, B, as shown substantially in Fig. 3, acting within the compass box, and connecting with the graduation of the stationary ring so that the two graduations shall meet precisely at the end of the needle, the whole arranged substantially as and for the purposes set forth.

43,037.—Apparatus for bending Metal Bars.—George J. Neveil, Philadelphia, Pa.:

I claim, first, The lever, D, in combination with the arm, F, and its projection, i, or their equivalents, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the aforesaid lever and arm, or their equivalents, with the adjustable plate, G.

43,038.—Comb.—Elfameo M. Noyes, Newark, N. J.:

I claim a hair-comb formed by attaching to the body of the comb without rivets or cement, a metallic back or casing, with or without the ends of said metallic back or casing closed down over the ends of the body of the comb, substantially as and for the purpose set forth.

43,039.—Water Wheel.—Dewey Philips, Shaftsbury, Vt.:

I claim, first, The conductor, E, formed circular at one end and rectangular at the other end, in combination with the cylinder, H, sluice, S, and gate, g, for the purposes and as specified.

Second, I claim the band of leather or other flexible material surrounded by the ring, w, and kept to its place by the ring, u, and adjusting screws, in combination with the cylinder, H, and wheel, A, or disk, K, for the purposes specified.

Third, I claim the safety valve, V, in combination with the gate, g, the said valve being near the gate, as and for the purposes specified.

Fourth, I claim the combination of cylinder, H, sluice, S, chamber, G, and water passages, A, in the manner and for the purposes specified.

43,040.—Churn.—Edward Porter, Tallmadge, Ohio:

I claim the special arrangement of the detachable oblique shaft, E, beaters, H H′, arms, I I′, and cover, D, when used in connection with the body or pail, B, and the whole so constructed as to make a churn and pail combined as and for the purpose specified.

43,041.—Machine for grinding, cutting and engraving Glass.—T. J. W. Robertson, New York City:

claim, first, The arrangement of the cutters or polishers to press with a yielding pressure against the surface of the glass, substantially as herein shown and described.

Second, The combination of the cutters or polishers with swinging arms, H H′, substantially as herein shown and described.

Third, The cutting, polishing or forming of ornamental designs upon the glass, by causing the cutters or polishers to press against the glass, and imparting to the glass during said pressure by means of eccentrics or undulating surfaces, a combined or alternate vertical and rotary movement, substantially as herein shown and described.

43,042.—Machine for cutting, polishing, dressing and ornamenting Glass.—T. J. W. Robertson, New York City:

I claim, first, The construction of the shaft or holder, H, which carries the glass, so that it will vibrate to and from the cutter or polisher, substantially as and for the purpose herein shown and described.

Second, The pressing of the glass with a yielding pressure against the cutter or polisher, substantially as herein shown and described.

Third, The combination of the vibrating frame, I, with the glass-holder, H, substantially as herein shown and described.

Fourth, The combination of the spring treadle and belt-shipper with the glass-holder, H, and cutter, h, substantially as herein shown and described.

Fifth, Imparting a vertical or a lateral movement or a combined vertical and lateral movement, to the glass or other article to be ornamented, substantially as herein shown and described.

Sixth, The combination of a governing lever or pointer, S, which is subject to the will of the operator, and a glass-holder which obeys the pointer, substantially as herein shown and described.

Seventh, The combination of the wheel, L, arm, N, and shaft, D, substantially as herein shown and described.

Eighth, The combination of the adjustable segment, O, with the wheel, L, and shaft, D, substantially as herein shown and described.

Ninth, The combination of the shaft, D, and segment, O, with the segment, P, and lever, S, in the manner herein shown and described.

Tenth, The combination of the shaft, D, lever, B, elbow-lever, X, and rod, U, with the lever, S, substantially in the manner herein shown and described.

Eleventh, The combination of the lever, S, with the fork, R, sleeve, Q, and rod, U, in the manner substantially as herein shown and described.

Twelfth, The arrangement of the cutter or polisher so that the position of its axis may be changed or varied in correspondence with the changes or curvatures of the lines of the design, substantially as herein shown and described.

Thirteenth, The employment of adjusting mechanism between the lever, S, and the glass-holder or the cutter for the purpose of enlarging or diminishing at will the dimensions of the ornament or figure to be executed upon the glass.

43,043.—Machine for ornamenting Glass.—T. J. W. Robertson, New York City:

I claim, first, A mechanism for polishing, ornamenting and roughing glass, in which the glass rotates while the brushes, straps, polishers, or their equivalents simply rest or press upon the glass with a yielding pressure, substantially as herein shown and described.

Second, The production of wave spiral or intersecting lines upon the glass by giving to the brushes, straps, polishers, or their equivalents, a movement across the line of rotation of the glass by automatic mechanism.

Third, The vibrating lever, t, and adjustable link, u, employed to communicate a variable motion from the pattern-wheel to the frame, f, as explained.

Fourth, The combination of the catch, p, and spring, s, operating in the manner described to secure the pattern wheel, n, upon the face plate, m.

43,044.—Carriage Brake.—Wm. D. Sheldon, Wolcott, N. Y.:

I claim the arrangement and combination of the hinged tongue, B, with its slot, d, the sliding rod, D, with its pin, f, and bow, g, and the levers, E E, with slots, h h, in their inner ends, all operating together, substantially as and for the purpose herein specified.

43,045.—Sash-fastening.—Anthony M. Smith Brooklyn, N. Y.:

I claim the arrangement and use of the vertical spring-catch, A and C, and segment bearing, B, with stop, S, in the manner and for the purpose substantially as described and shown in the drawings.

43,046.—Roasting and desulphurizing Ores and Minerals.—Simon Stevens, New York City:

I claim, first, The use of hydro-carbon vapors or gases as fuel in the roasting and desulphurizing of ores or minerals.

Second, The desulphurizing and roasting of ores by means of a combined blast or current of hydro-carbon vapor, air and steam, applied in the manner substantially as herein set forth.

Third, The process herein described of separating and collecting the precious metals from pyritous ores, which process consists in roasting and desulphurizing the ore receiving it while hot in water, washing and removing the light earthy matter, and amalgamating the precious metals, these several operations forming a continuous process, as above set forth.

43,047.—Preparing and treating Grain for Distillation.—Macklot Thompson, St. Louis, Mo.:

I claim, first, The process herein-before described of macerating grains, roots, tubercules, and other vegetable matter capable of furnishing alcoholic spirits, by the employment of acids in connection with water at a high temperature.

Second, The manner herein described of treating grain, etc., by submitting the same to the action of acidulated water in combination with the appropriate degree of heat for the production of the maximum quantity of sugar.

Third, The method of working mashing tubs by the employment of apparatus such as described, and operating the same in continuous series or in sections, substantially in the manner herein described.

Fourth, The method of effecting the maceration of grain, etc., by apparatus such as herein described, and operating the same by steam, applied in the manner and for the purposes set forth.

43,048.—Furnace for melting Metals, etc.—John Thomson, New York City, & Thomas Widdowfield, Brooklyn, N. Y.:

We claim, first, The crucible, B, made with double-arched sides and bottom, as shown and described.

Second, The rounded corners, b, of the crucible applied in combination with the concave seats, c, in the casing and with the tap hole, d, in the manner and for the purpose substantially as set forth.

Third, The double concave cover, D, in combination with the furnace, A, and crucible, B, constructed and operating as and for the purpose specified.

43,049.—Wind-wheel.—Alfred Trim, Iconium, Iowa:

I claim the swinging wings or sails, C, having the weights, D, connected with them, in combination with the adjustable shield, G, all arranged to operate substantially as and for the purpose herein set forth.

I also claim the ball governor, L, in combination with the bent lever, M, provided with the adjustable weight, R, and the pulley, Q, on the wind-wheel shaft, B, substantially as and for the purpose herein set forth.

I further claim the catches, E, in connection with the arms, f, on the wings or sails, C, and the adjustable bar, F, attached to the framing, A, all arranged substantially as and for the purpose herein specified.

43,049.—Machine for cutting and embossing Leather.—S. D. Tripp, Lynn, Mass.:

I claim, first, The adjustable block or table, I, in combination with the rising and falling head, B, and with the automatic feed mechanism, constructed and operating substantially in the manner and for purpose shown and described.

Second, The adjustable box, E, in combination with the head, B, cutter or die, D, and table, I, constructed and operating substantially as and for the purpose set forth

Third, The fingers, h, in combination with the arms, j, lever, H, cam, G, and adjustable stop, k*, constructed and operating substantially as and for the purpose specified.

Fourth, The tappet, m, lever, a, and finger, o, in combination with the cutter-head, B, table, g, and fingers, h, constructed and operating substantially as and for the purpose described.

Fifth, The yielding pin, p, in combination with the feed mechanism and with the mechanism for releasing the material from the fingers, h, constructed and operating substantially as and for the purpose specified.

Sixth, The adjustable plate, J, in combination with the frame, A, block, I, and screws, g g′ g″, constructed and operating substantially as and for the purpose set forth.

43,051.—Water-wheel.—A. H. Wagner, Chicago, Ill.:

I claim making the floats perpendicular throughout their length and breadth, and radial, or nearly radial, where they receive the first impulse of the water, and curving them where they extend or pass under the center of the wheel, substantially as shown and described. And, in combination with the described wheel, I claim the stationary concave plate, G, placed under the floats to hold the water up between the floats of the wheel.

43,052.—Boots and Shoes.—W. Powell Wave, New York City:

I claim a plate made of steel, or other metallic substance, placed between the inner and outer soles, extending from the heel to the toe, in combination with a metallic counter, the whole substantially as herein set forth.

43,053.—Bench Plane.—R. Washburn, Ramapo, N. Y.:

I claim the slotted wedge, D, secured in the throat of a plane, A, by means of a set screw, b, and operating in combination with the same and with the plane iron, C, substantially in the manner and for the purpose specified.

[This invention consists in the employment or use of a slotted wedge, inserted in suitable guide grooves in the front side of the throat of a plane, and adjustable by means of a set screw in combination with the plane-iron in such a manner that, by means of said slotted wedge and set screw, the plane-iron can be firmly secured in the desired position, and, by the point of the wedge, the shavings are thrown off from the cutting edge of the iron, and caused to pass up through the throat of the plane with ease and facility, and the use of a double iron can be dispensed with.]

43,054.—Crushing and pressing Machine.—Charles and Orson Waste, Cameron, Ill.:

I claim, first, Combining a hay-crushing machine with a hay-press, both constructed and arranged as described, the operative parts of the crushing machine so constructed that the hay is crushed, cut in sheets of proper size, and pressed into bales at the same time, and with the same power.

Second, So constructing and arranging the operative parts of our combined crushing and pressing machine that, while the traveling beam, L, is reversed, the revolving of the crushing rollers remains unchanged, in the manner described.

Third, So arranging the various parts of our combined pressing and crushing machine that the traveling beam, L, may remain stationary while the revolving of the pressure rollers remains the same, in the manner described.

43,055.—Thatching Roofs.—James Weed, Muscatine, Iowa.

I claim the applying for thatching purposes of straw to the roofs and sides of buildings by inserting the former between strips or slats attached to both sides of the rafters and studs, substantially as described.

I further claim the filling in or packing of the space between the strips or laths, at both sides of the rafters and studs, with straw or other suitable material, when used in connection with the external layers of straw for the purpose specified.

43,056.—Stop-cock and Case for Pipes leading from Street Mains.—Jas. G. Weldon, Pittsburgh, Pa.:

I claim the within-described stop-cock case and stop-cock, constructed and applied in the manner and for the purpose described, as a new article of manufacture.

43,057.—Fastening for Wooden Blocks.—Heber Wells, New York City:

I claim the rods, c, provided with the screw nuts, B, in combination with the keys or checks, C, all arranged and applied substantially as and for the purpose herein set forth.

43,058.—Fruit Drier.—Thomas L. West, West Salem, Wis.:

I claim the box or case, A, perforated at its upper and lower ends, and provided with a central tube, B, either with or without a register to communicate with the pipe of a stove or heater, substantially as and for the purpose set forth.

I further claim the shelves or trays, C, fitted in the box, A, and provided with the corrugated perforated bottoms, d, substantially as and for the purpose specified.

[This invention relates to a new and useful device for drying fruit by artificial or stove heat, and which may be applied to the pipe of any ordinary stove or heater.]

43,059.—Spindle-bolster for Spinning-machines.—John C. Whitin, Northbridge, Mass.:

I claim the ball and socket, with packing and cap screw, applied to the upper bearings of spindles of speeder or fly frames, essentially as above described.

43,060.—Ditching Machine.—George W. Wiggin, Exeter, N. H.:

I claim the combination of the sole-plate, P, mold-boards, M M′, curved and inclined as set forth, cutters, C C′ and K, and beams, S S, and fender, D, or their equivalents, substantially as and for the purpose herein described.

43,061.—Furnace for smelting Ores.—Jonas Winchester, New York City:

I claim, first, The employment in the smelting of ores of a crucible or other vessel, chamber or receptacle for containing the ore so placed in a furnace, as to be wholly or for the most part surrounded by the fuel, and so provided with openings or perforations that the flame and heated gaseous products of combustion from the fuel are forced into it, upon, into and through the ore, substantially as herein specified.

Second, In combination with a crucible, vessel, chamber or receptacle for ore, so constructed and applied within a smelting furnace, I claim introducing the blast, beneath and through a grate, or its equivalent, whereby it is carried upward with an equally distributed pressure upon and among the fuel, and the flame is so forced in it through the openings of the said crucible, vessel, chamber or receptacle, that the said openings have the effect of so many tuyeres or blow-pipes, substantially as herein described.

43,062.—Submarine Armament.—John Wood, Brooklyn, N. Y.:

I claim a horizontal pipe provided with the air-escape pipe and a series of slides containing sheets of metal or other material, and fitted so that said slides can be dropped in succession, as specified.

43,063.—Latch.—G. C. Worth, Upper Sandusky, Ohio:

I claim, first, The bolt, B, having the latch, C, fitted within it and provided with the pendant, c, in connection with the case, G′, in the jamb, f, of the door frame, all arranged to operate in the manner substantially as and for the purpose herein set forth.

Second, The knob arbors, D D, when used in combination with the bolt, B, latch, C, and case, G′, and arranged substantially as and for the purpose specified.

Third, The sliding bar or bars, H, arranged to be operated by a key in any proper manner, said bar or bars are used in combination with the bolt, B, latch, C, drop bolt, K, and knob arbors, D D, to serve as a lock for the latch, substantially as set forth.

[The object of this invention is to obtain a combined latch and lock for doors which will serve as an efficient fastening and be capable of being constructed and applied at a small cost, and used equally well in the capacity of either a latch or a lock.]

43,064.—Rotary Engine.—O. Zellen & C. Taftezon, New York City:

First, I claim the combination and arrangement of the cylinders, B C C, the steam passages, D and E, with the two turning cocks, I.

Second, I claim the arrangement of the steam passages, F F and D D, for the purpose of conveying the steam to the pistons of the center cylinder.

43,065.—Process of purifying Saccharine Liquids.—Auguste Pierre Dubrunfaut, Paris, France:

I claim, first, The employment or adaptation as herein-before described of the phenomenon of endosmose for the treatment of molasses, sirups, saccharine juices, and other products.

Second, Constructing apparatus in which the said treatment takes place, substantially as herein-before described.

43,066.—Preparing Coloring Matters for Dyeing and Printing.—Augustus W. Hofmann, London, England. Patented in England May 22, 1863:

I claim the production of new coloring substances by the action of the iodides and bromides of alcohol radicals on rosaniline, as herein-before described.

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43,067.—Machinery for puddling Iron and Steel.—Thos. Harrison, Tudhoe, England. Patented in England Dec. 8, 1863 :

I claim the mounting the cylinder, a, which gives motion to the tool, g, on a center or pivot, c, and combining therewith apparatus, substantially es described, for gradually turning the cylinder, a, to and fro on its center or pivot, c, so that the tool, g, may in each successive stroke pass over a different course on the bed of the furnace, b.

43,068.—Neck-tie Supporter.—B. F. Bean (assignor to himself, Seth D. Woodbury & James A. Austin), Lynn, Mass.:

I claim the neck-tie supporter, A, constructed and operating substantially as described.

43,069.—Clothes Frame.—Henry Buell (assignor to himself & Henry A. Green), Mount Morris, N. Y.:

I claim the combination of the bars, A A, rods, B B, washers, b b, pivoted arms, C C C, brackets, D, and pegs, E, all constructed and arranged as and for the purposes specified.

43,070.—Bed-plate for Paper-mill Engines.—George A. Corser (assignor to himself and Anthony Hanky), Leicester, Mass.:

I claim an angular bed-plate, for working paper stock, composed of two or more sets of angular plates, when said plates are arranged in such a manner that the angles of the adjoining sets are inverted in relation to each other, substantially in the manner and for the purposes described.

I also claim the combination of the angular metal plates, b c, as herein arranged, and wooden fillings, h, with the side plates, A, arranged in relation to each other, substantially as and for the purposes set forth.

I also claim the combination with the angular plates for paper engines, arranged as herein described, of the parallel side plates, A A, in the manner and for the purpose herein set forth.

43,071.—Apparatus for melting Metals for casting Stereotype Plates.—Clemoire F. Cosfeldt, Jr., & Thomas T. Pears (assignors to themselves and Alfred Martien), Philadelphia, Pa.:

We claim, first, The melting pot, C, and its spout, F, combined with a sliding door, H, substantially as set forth for the purpose specified.

Second, The sliding door, H, with its beveled lower edge arranged and operating in respect to the spout, F, and the inclined plate, P, substantially as and for the purpose herein set forth.

Third, The plate, P, with its adjustable arms, Q, arranged in respect to the spout, F, substantially as described.

Fourth, The sliding door, H, rollers, I I, their sliding boxes or bearings, i i, and set screws, m m, arranged in respect to each other substantially as set forth.

Fifth, The sliding door, H, with its racks, n n, arranged in respect to the shaft, L, with its pinions, K K, and lever, M, substantially as and for the purposes specified.

Sixth, The sliding door, H, in combination with the set screw, q, or its equivalent

43,072.—Hat.—Philip Curtis (assignor to himself and A. L. Bayley), Amesbury, Mass.:

I claim a hat finished substantially as described.

[This invention consists in embossing or producing figures upon felt or other hats, by the combined agencies of pressure and friction, either by hand or machinery.]

43,073.—Separating the Fibers of Hemp, Flax, etc.—Jim B. Fuller (assignor to himself and James P. Upham), Claremont, N. H.:

I claim, first, Erecting the separation of the fibers of hemp, flax, and other similar plants, by first subjecting them, while in the form of a sheet, sliver, roving, or other s milar condition, and while in a close vessel with steam, water, or other liquid at high temperature and pressure, to the pressing action of rollers, so placed in such vessel that the said sheet, sliver, or roving, shall be drawn between them as they rotate, substantially as and for the purposes specified.

Second, I claim drawing the sheet, sliver, or roving out of the apparatus by and between rollers which press back into the apparatus all or nearly all the resinous, gummy, coagulated, and coloring matter, while it is yet in a heated aud softened state, substantially as and for the purposes specified.

43,074.—Barrel Machine.—R. W. George, Richmond, Maine, assignor to himself and Solomon S. Gray, Boston, Mass.:

I claim, first, Arranging the pins, q and l, in the table, W, substantially as set forth and for the purpose described.

Second, The combination of the flange, m, spurs, J J, saws, M M, cutter, L, and chamfering knife, O, when constructed and operating substantially as described.

Third, The clamping apparatus and table, W, when arranged and operating substantially as described.

43,075.—Funnel.—G. F. Herrick (assignor to himself and Charles Sheffler), Sharon, Minn.:

I claim the arrangement of elastic packing, C, with the nozzle of the funnel, A, in combination with the bent pipe, D, and valve, F, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the application of a coating of india-rubber, or other soft and elastic material, to the nozzle of a funnel in combination with a vent pipe extending down through the nozzle, and connecting with a cork or valve in such a manner that when the nozzle is inserted into the neck of a bottle or other vessel, an air-tight joint is produced between the circumference of said nozzle and the inner surface of the neck, and in pouring in liquid the air escaping from the vessel finds its way out through the vent pipe, and when the vessel is full that quantity of liquid remaining in the funnel can be easily removed by closing the mouth of the nozzle by means of the cork or valve.]

43,076.—Churn Power.—George Lewis (assignor to himself, Ralph Hoyt and C. W. Hoyt), Panama, N. Y.:

I claim the oscillating bars, J, with slots, a, and pivots, d, in combination with the hinged arms, C E, cross bars, D F, dasher-staff, G, and tub or barrel, H, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in a revolving frame connected to, and adustable on, the sweep which turns loosely on a vertical shaft, passing through the center of the stationary master wheel, in combination with suitable pulleys and bolts, one of which extends round the master wheel and round a pulley mounted on an arbor, which has its bearings in the revolving frame and which also has another pulley mounted on its upper end, from which a second bolt extends to a pulley on the upper end of the central shaft of the master wheel in such a manner that by shifting the revolving frame toward or from the center the bolts which transmit the motion from one shaft to the other can be slackened or tightened as may be required, and by carrying the movable frame round the master wheel, a rotary motion is imparted to the central shaft which can be transmitted by suitable bolts or pulleys to the working machines, which are to be set in motion by the horse power.]

43,077.—Thread-waxer for Sewing Machine.—Gordon McKay, Boston, Mass., and Lyman R. Blake, Quincy, Mass., assignors to said Gordon McKay :

We claim a device for stripping superfluous wax from thread, and for other analogous uses, when arranged to operate substantially as described.

43,078.—Lock.—J. W. Miller, Waynesboro, Pa., assignor to himself and Joseph Snively, Jr., Greencastle, Pa.:

I claim, first, The combination of the bolt, d, and spring, h, with the key, k, when constructed and operated as recited herein.

Second, I claim the plate, m, in combination with the lock and key, substantially as and for the purposes herein set forth.

43,079.—Gas Apparatus.—Abraham Myers (assignor to himself, C. M. Hall, and E. R. Myers), Philadelphia, Pa. :

I claim forming a communication between the hydraulic main of gas apparatus, and a retort or retorts, substantially as and for the purpose herein set forth.

RE-ISSUES.

1,690.—Clover Bolt.—E. K. Collins, Chili, N. Y. Patented Aug. 16, 1859 :

I claim giving the counter movement longitudinally to the two single bolts, B and B', when used in combination with the thrashing and hulling cylinders of clover machines, whether said bolts have an alternating rising and falling motion or not.

1,691.—Harness Snap.—R. W. Jones, Syracuse, N. Y Patented Nov. 3, 1863 :

I claim, first, Placing the spring which acts upon the tongue of a snap-hook loosely into a recess cast or otherwise produced in the body of the hook, substantially as and for the purpose specified.

Second, The cam, g, on the inner edge of the tongue of a snap-hook arranged in combination with the spring acting on said tongue and with its pivot, in such a manner that the force in opening the tongue is diminishing instead of increasing.

1,692.—Mode of slinging Accouterments.—W. D. Mann, Detroit, Mich. Patented Dec. 3, 1863 :

I claim so arranging the slinging attachments, accouterments and equipments of infantry or cavalry soldiers, that when in use the weight of the cartridge box will be counterbalanced by the other accouterments and equipments or arms usually worn upon the body, and the weight of the whole borne upon the shoulders, substantially as described.

I also claim the combination of the shoulder straps, B B, with the belt strap, A, whether for infantry or cavalry equipment, substantially in the manner and for the purpose herein shown and described.

I also claim the combination of shoulder straps, B B, with the cartridge box, G, substantially in the manner and for the purpose herein shown and described.

I also claim the attachment of the knapsack to the shoulder-straps, B B, substantially in the manner and for the purpose herein shown and described.

I also claim the slinging straps, J J, attached to the knapsack, substantially in the manner and for the purpose herein shown and described.

I also claim the fly-strap attached to the lower part of the knapsack, substantially as and for the purpose herein shown and described.

1,693.—(A).—Revolving Fire-arm.—The Moore's Patent Fire-arms Company (assignees of Daniel Moore), Brooklyn, N. Y. Patented April 28, 1863 :

I claim, first, Constructing the revolving-chambered cylinder of a fire-arm with the rear portion of such cylinder turned off to form a ring and produce an opening into the rear end of each chamber through which access is afforded for pushing the exploded cartridge case out at the front end of the chamber, as specified.

Second, The circular abutment, 2, at the rear end of the cylinder partially closing the chambers, in combination with a fixed abutment, 3, projecting from the stock and covering the open portion at rear end of the chamber on line with the barrel, as set forth.

1,694.—(B).—Revolving Fire-arm.—The Moore's Patent Fire-arms Company (assignees of Daniel Moore), Brooklyn, N. Y. Patented April 28, 1863 :

I claim a movable gate applied at the forward end of the cylinder. to retain the metallic cartridge cases when in the chambers, or allow of the introduction or removal of such cases, after said gate has been moved aside, substantially as specified.

1,695.—(A).—Grain and Grass Harvester.—Cyrenus Wheeler, Jr., Poplar Ridge, N. Y., assignee of Sylvester Colburn, Ansonia, Conn. Patented July 3, 1855 :

I claim making ledger plates for harvester fingers elastic, by combining therewith a spring or its equivalent, substantially as set forth.

I also claim securing the back end of the ledger plate against lateral movement, by a recess formed in the finger for its reception, substantially as set forth.

I also claim the construction of the guard fingers with two recesses for securing the ledger plate against lateral movement, substantially as and for the purposes set forth.

Ialso claim the brace bars in front of the cutter bar, as lateral bearings for the cutter, in combination with the guard finger and ledger plate, substantially as set forth.

1,696.—(A).—Grain and Grass Harvester.—Cyrenus Wheeler, Jr., Poplar Ridge, N. Y., assignee of Sylvester, Colburn, Ansonia, Conn. Patented July 3, 1855 :

I claim forming with the guard finger, below the cutter and in front of the cutter bar, projecting brace bars, serving as lateral bearings for the cutter and as braces between the fingers, substantially as set forth.

I also claim forming the brace bars with a flange or rib projecting back from them under the front edge of the cutter bar, to give additional stiffness, and to protect the cutter bar, substantially as set forth.

I also claim, in combination with the braces in front of the cutter bar, making that part of the guard finger between the cutter bar and finger bar wide enough to serve as braces between the fingers, substantially as set forth.

DESIGNS.

1,949.—Spoon or Fork Handle.—C. F. Richers (assignor to Charles Wood, Charles Hughes and Stephen Frabrien), New York City.

1,950.—Trade-mark.—G. W. Westbrook, New York City.

1,951.—Agricultural Furnace.—Russell Wheeler and S. A. Bailey, Utica, N. Y.

1,952.—Spoon or Fork Handle.—George Wilkinson (assignor to Gorham & Co.), Providence, R. I.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three ast ex-Commissioners of Patents :—

MESSRS MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & Co.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents ar suffered to expire without any effort at extension, owing to want of proper information on the part of the patent tees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention'

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Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursue in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c, may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfuly answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row New York

Notes and Queries

E. V. F., of Maine.—The "American Journal of Photography," is published by Professor Charles A. Seely, 244 Canal street, New York. You can obtain the instrument for testing the strength of silver solutions from him.

G. T., of N. Y.—Your paddle-wheel appears to be new and patentable, although in view of the large number of patents already taken out in that class of inventions it might probably be most advisable to have a preliminary examination made in regard to it in the Patent Office, at Washington. Expense $5.

O. M. S., of R. I.—Iron that is to be immersed in water is protected by paint formed of red-lead and boiled linseed oil. A more durable plan of protecting iron under water is to cover it with zinc—galvanising as it is absurdly called. Iron may be enameled by baking a thin coat of glass upon the surface; water pipes are sometimes lined in this way.

L. W., of N. Y.—We never received your inquiry about brass springs. Any machinist will contract to deliver a lot, but we are not aware of any special machines for the purpose.

S. B. E., of Conn.—We observe nothing patentable in your mode of cleaning boilers.

C. C., of Pa.—The invention described in your letter for raising water is not patentable, there are now models in the Patent Office of the same thing. The hydraulic jack seems to contain some slight novelty, but before incurring expense upon it we advise a preliminary examination to be made at the Patent Office We send you a pamphlet of advice by mail.

R. O. D., of Maine.—A re-issue is designed solely to correct a defective patent. In a re-issue you are entitled to claim whatever was new in the model that you presented at the time the application was made for the patent. In the re-issue you can amend the claim, and make additional ones if you desire to do so If the re-issue is refused the Commissioner will, upon your order, return the original patent.

C. M., of Pa.—The air pump in a condensing engine performs a double duty; it introduces the cold water for condensing the steam, and expels the incondensable gases, such as atmospheric air, carbonic acid, ammonia, etc., which are absorbed by water, and thus find their way into the boiler.

C. G., of Conn.—We cannot judge of the defects in the draught of your chimney without a better knowledge of its peculiar construction. You had better put a chimney cap upon it or increase its hight two or three feet. The higher the chimney the better the draught.

L. E. A., of Ohio.—Electro-magnetic brakes for cars are not new. We do not consider them practicable. Steam brakes have been tried, but were not successful.

P. W., of Ohio.—Tinned tacks are chiefly useful to prevent injury to a carpet from rust. We never heard of any other virtue ascribed to them.

R. W. S., of Pa.—To cut off by the lap on a valve after the piston has passed through one-half its stroke, multiply the stroke of the valve by 354; the product is the lap required in terms of the length of stroke. For seven-twelfths of the stroke multiply by 323; for two-thirds the stroke, by 289; three-fourths, 250; five-sixths, 204. This rule is the one given by Templeton, and in a small engine we have found the half stroke figures correct.

P. E., of N. Y.—King's "Notes on the Steam Engine" is a useful work for engineers desiring information. Bourne's Catechism is also good.

J. M. W.—An iron rod one inch in diameter and twelve inches long weighs 2.7 pounds. A one-inch square twelve inches long weighs 3.4 pounds.

L. C., of Conn.—We have heard that cheap smoking tobacco is made from cigar stubs scattered in the streets, but have no means of ascertaining whether it be true or not.

W. L. D.—A marine engine so called, will work as well on land as at sea. A locomotive would be a marine engine if it went to sea. Marine engines are essentially land engines built stronger.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, June 1, 1864, to Wednesday, June 8, 1864:—

A. J. L., of N. Y., $25; M. H. K., of N. Y., $25; F. W. B., of N. Y. $10; A. W. H., of N. Y., $25; W. & R., of Cal., $10; J. C. O., of Wis., $25; H. U., of Conn., $80; W. M. H., of Chili, $16; D. L., of Vt., $25; J. L. R., of Mo., $10; W. C., of Pa., $16; J. F. L., of Ill., $45; A. M., of Ind., $16; A. B. A., of Conn., $16; T. & J. N. T., of Ind., $22; J. W. D., of Mich., $10; S. G., of N. Y., $25; A. T. S., of Ind., $21; W. P. B., of Mich., $25; D. S., of Cal., $41; H. L., of Ky., $20; H. M. H., of Pa., $20; G. K. W., of Conn., $16; C. C. & V., of N. Y., $41; G. A., of N. Y., $20; E. E. C., of Ill., $20; A. T., of Canada, $20; C. S. of N. Y., $20; J. M. F., of Wis., $82; E. S., of N. Y., $20; J. R. B., of N. Y. $26; J. W. S., of Colorado Territory, $25; H. C. E., of N. Y., $25; W. & R., of N. Y., $10; J. P., of N. J., $25; P. W., of Ill., $16; E. B. B., of Conn., $16; J. N. J., of Wis., $25; A. P., of Ohio, $12; T. R. F., of Mich., $16; O. R. B., of N. Y., $405; J. L. W., of Ohio, $16; W. J. W., of Ohio, $30; A. A. K., of Minn., $16; F. & M., of Mich., $25; T. G P., of Iowa, $25; A. & T., of Mass., $16; M. I. & W. T. D., of —— $15 W. H. P., of R. I., $25; J. B., of Ind., $25; H. A. K., of N. J., $25; W. & R., of N. J., $22; I. P. T., of N. Y., $82; P. F. D., of La., $16; A. A. W. H., of N. Y., $60; D. & S., of Pa., $20; J. W., of Mass., $61; G. H. M., of Ohio, $20; H. & R., of Ohio, $20; E. P., of N. Y., $20; W. L. M., of N. J., $32; S. L. G., of Conn., $20; J. W., of Mass., $60; C. & O. B., of N. Y., $25; A. C. R., of Pa., $41; J. P., of Ill., $25; W. J., of N. Y., $16; H. T., of Wis., $25; S. S. H., of Maine, $25; J. G. T., of N. Y., $25; R. H., of N. Y, $16; I. B., of N. Y., $16; C. B., of Mich. $10; T. & J. C., of Mich., $16; D. & N., of Maine, $15; J. F., of Ohio, $25; I. T. Y., of N. Y., $25; N. S. W., of N. Y., $16; T. W. D., of Cal., $48; J. B., of Iowa, $25; N. H., of N. Y., $25; L. C., of Minn., $20; C. & M., of Ky., $22; E. F., of N. Y., $16; J. D. H., of Pa., $20; T. S. S., of N. Y., $16; A. C. R., of Pa., $41; J. T. M., of Ill., $20; G. W. & H. H. F., of N. Y., $20; S. DeM., of N. Y., $20; J. H., of Conn., $45; L. M., of Ill., $20; E. W.. of N. Y., $20; W. & H., of Cal., $20; C. R., of Pa., $20; H. T., of U. S. N., $16; J. S., of Iowa, $20; H. McK., of Ill., $20; J. B., of N. Y., $16; D. & A., of N. Y., $20; P. L., of Cal., $45; L. H., of N. Y., $49; W. W., of Conn., $44; M. H. M., of Ohio, $45; F. M. W., of Saxony, $79; A. G., of N. Y., $16; H. & R., of Pa., $20; J. S. B., of N. J., $20; D. S., of Cal., $32; E. H., of N. Y., $16; B. & P., of N. Y., $45; A. W., of N. Y., $45.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, June 1, 1864, to Wednesday, June 8, 1864:—

C. N., of N. Y.; O. C. P., of N. Y.; A. J. L., of N. Y.; J. R. B., of N. Y.; J. W., of Mass.; M. H. K., of N. Y.; J. W. S., of Colorado Territory; F. W. B., of N. Y.; H. C. E., of N. Y.; C. & O'B., of N. Y.; A. W. H., of N. Y.; W. & R., of N. J.; A. C. R., of Pa.; E. C. S., of Maine; S. L. G., of N. Y.; J. O. H., of Pa.; A J. V., of N. Y.; J. F., of Ohio; F. & M., of Mich.; D. L., of Vt.; W. J. W., of Ohio; R. G., of Mo.; J. G. T., of N. Y.; J. F. L., of Ill.; S. S. H., of Maine; I. N. J., of Mass.; A. P., of Ohio; M. S., of Cal.; J. P., of N. J.; J. C. O., of Wis.; H. T., of Wis.; T. G. P., of Iowa; W. P. B., of Mich.; N. H., of N. Y.; J. B., of Ind.; J. B., of Iowa; W. H. P., of R. I.; H. A. K., of N. J.; J. P., of Ill.; I. P. T., of N. Y. (2 cases); C. C. & V., of N. Y.; A. W. H., of N. Y.; L. H., of N. Y.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

THE USEFUL METALS AND THEIR ALLOYS, including Mining Ventilation, Mining Jurisprudence, and Metallurgic Chemistry employed in the conversion of Iron, Copper, Tin, Zinc, Antimony, and Lead Ores, with their applications to the Industrial Arts. By Scoffern, Truran, Clay, Oxland, Fairbairn, Aitken, Pickett. 1 vol. 8vo., price $4.50, in cloth. For sale by D. VAN NOSTRAND, 192 Broadway. Sent free by mail on receipt of price. 25 1

AUCTION SALE OF FOUNDRY AND MACHINE SHOP, situated at Lewiston Falls, Me., and now doing a good business. The whole Property, including Tools, Fixtures, Water-power, Land, Dwelling, &c., worth $12,000, will be sold to the highest bidder, without reserve, on Wednesday, June 22, 1864. For particulars, address—C. L. & J. T. EUSTIS, Auburn, Me.; or, Brooks & Chamberlin, Auctioneers, Lewiston, Me. 25 2*

MACHINERY.—ONE ENGINE LATHE, 18 FEET BED, Swings 30 inches. One Planer, planing 12 feet long and 36 in. square. A so, Chucks, Drills, Boiler Pumps, Belting, &c., in store and for sale, at No. 8 Dey street, New York; FAIRMAN & WILLARD. 25 1*

WANTED.—THE ADDRESS OF EDWARD T. EWELL, of Brooklyn, Patentee of Paint Cans. Send address to H EVERETT, Philadelphia. 25 2*

TO PAINT MANUFACTURERS.—DRAWINGS OF Apparatus. Processes to Manufacture Colors of Lead and Zinc, Lakes. Preparation of Siccative Oils. Process to Dye Wood. Analysis of Colors, and Essays of Raw Material. Address Prof. H. DUSSAUCE, Chemist, New Lebanon N. Y. 1*

GOOD STORIES ALWAYS FORM A PART OF THE Contents of the ATLANTIC MONTHLY. They are supplied by such writers as Harriet Prescott, J. T Trowbridge, Caroline Chesebro, Bayard Taylor, Rose Terry, and other contributors of eminent ability. Some of the best stories in the language have been written for and published in the ATLANTIC MONTHLY. Subscriptions may begin with any number. Terms, $3 a year, 25 cents a number, postage paid. Clubs at a liberal reduction Address the publishers, TICKNOR & FIELDS, Boston.

ARMY CLOTHING AND EQUIPAGE OFFICE, Cincinnati, Ohio, June 1st, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED until Wednesday, June 15th, 1864, at 2 o'clock P.M., for furnishing this Department (by contract) with—

		Army Standard.
Company Order Books,		
do	Clothing Books,	do
do	Descriptive Books,	do
do	Morning Report Books,	do
Post Order		do
Post Letter		do
Post Guard Report		do
Regimental Order		do
do	Descriptive	do
do	Index	do
do	Order	do

Samples of which may be seen at the Office of Clothing and Equipage in this city.

To be delivered free of charge, at the U. S. Inspection Warehouse, in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods must distinctly state in their bids, the quantity they propose to furnish, the price, and time of delivery.

Samples when submitted, must be marked and numbered to correspond with the proposal; and the parties thereto, must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty, signed by two responsible persons, must accompany each bid, guaranteeing that the bidder will supply the articles awarded to him under his proposal.

Bids will be opened on Wednesday, June 15th, 1864, at 2 o'clock P. M., at this office, and bidders are requested to be present.

Awards will be made on Thursday, June 16th, 1864.

Bonds will be required that the contracts will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thomas Swords, A. Q. M. G.

1 C. W. MOULTON, Captain and A. Q. M.

ARMY CLOTHING AND EQUIPAGE OFFICE, Cincinnati, Ohio, June 1, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED until Friday, June 17th, 1864, at 2 o'clock P. M., for furnishing this Department (by contract) with—

Uniform Coats—Infantry.
Uniform Coats—Artillery.
Forage Caps.

Samples of which may be seen at the Office of Clothing and Equipage in this city.

To be delivered free of charge, at the U. S. Inspection Warehouse in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods must distinctly state in their bids the quantity they propose to furnish, the price, and the time of delivery.

Samples when submitted, must be marked and numbered to correspond with the proposal, and the parties thereto must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty signed by two responsible persons, must accompany each bid, guaranteeing that the bidder will supply the articles awarded to him under his proposal.

Bids will be opened on Friday, June 17, 1864, at two o'clock, P. M., at this office, and bidders are requested to be present.

Awards will be made on Saturday, June 18th.

Bonds will be required that the contracts will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds, may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thomas Swords, A. Q. M. G.

1 C. W. MOULTON, Captain and A. Q. M.

ARMY SUPPLIES.

OFFICE OF ARMY CLOTHING AND EQUIPAGE, 502 BROADWAY, NEW YORK, June 8th, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this office until 12 M., on Tuesday, the 14th of June next, for furnishing by contract, at the Depot of Army Clothing and Equipage in this city,—

Felling Axes,

Samples of which can be seen at this office. Bidders will state the quantity they wish to supply, and the shortest time in which they can deliver it.

They will submit with their proposals a sample of the article they propose to furnish.

All proposals must be accompanied by a proper guaranty for the faithful performance of a contract.

The United States reserves the right to reject all bids deemed objectionable.

Proposals should be endorsed "Proposals for furnishing Axes," and addressed to

1 LT-COL. D. H. VINTON, Dy. Qr. Mr. Genl.

INVENTORS AND MANUFACTURERS OF AGRICULTURAL implements will find it to their advantage to send descriptive lists, prices, and references, to Box 257, Lyons, N. Y. 25 3*

LABORATORY OF INDUSTRIAL CHEMISTRY.—Advices and Consultations on Chemistry applied to Arts and Manufactures, Agriculture, etc. Plans of Factories, Drawings of Apparatus, Chemical Fabrications, and Commercial Assays. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

FOR SALE.—TWO SECOND-HAND BARREL SAWS nearly new. Also, 3 small Woodworth Planers, with side heads. Address MCNISH & BUTLER, Lowell, Mass., or Pittsburgh, Pa. 25 4*

FOR SALE.—A TWO-HORSE LOCOMOTIVE BOILER, in good order. A. & B. NEWBURY, Windham Center, N. Y. 25 4*

FOR SALE.—ONE FOUR-HORSE UPRIGHT PORTABLE Engine and Boiler, with all the fixtures. Also one six-horse engine, all nearly new and in good order, for sale cheap. Address Washington Manufacturing Company, Troy, N. Y. 25 4*

WANTED.—COTTON PRESSES.—PARTIES MANUfacturing Hay or Cotton Presses, will please send description, capacity, and cost. Direct to New York City Post-office. J. C. ASHTON & CO. 1

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COPARTNERSHIP NOTICE.—The name of the firm of JAMES O. MORSE & Co., has been changed to JAMES O. MORSE & GILLIS, and the business will be continued by the same partners at the old stand.

JAMES O. MORSE.
CHARLES J. GILLIS.

June 1st, 1864. 25 3

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WANTED.—THE ADDRESS OF ROBERT A. BETTS, of New York, Patentee of Boxes. Send address to H. EVERETT, Philadelphia. 25 2*

ORDNANCE OFFICE,
WAR DEPARTMENT,
WASHINGTON, D. C., May 25, 1864.

Sealed Proposals will be received at this office until Tuesday, the 14th day of June, 1864, for 8-inch Columbiad Shot and 8-inch Mortar Shell, to be delivered in the following quantities, at the undernamed arsenals, viz:—

8-INCH COLUMBIAD SHOT.

At the Watertown Arsenal, Massachusetts, 4,000.
At the Watervliet Arsenal, New York, 4,000.
At the New York Arsenal, Governor's Island, N. Y., 6,000.
At the Alleghany Arsenal, Pittsburgh, 4,000.
At the St. Louis Arsenal, Missouri, 2,000.

8-INCH MORTAR SHELL.

At the New York Arsenal, Governor's Island, N. Y., 20,000.
At the Watervliet Arsenal, New York, 5,000.

These projectiles are to be made of the kind of metal, and inspected after the rules laid down in the Ordnance Manual; the tensile strength of the iron for columbiad shot to be not less than 25,000 lbs. per square inch, and for mortar shells not less than 14,000 lbs. per square inch. Drawings can be seen at any of the United States Arsenals. The projectiles are to be inspected at the foundry when cast, and are to be delivered at the Arsenals free of charge for transportation or handling.

Deliveries must be made at the rate of not less than one-tenth (1-10th) of the whole amount contracted for per week; the first delivery to be made on the 29th day of June, 1864.

Failure to make deliveries at a specified time will subject the contractor to a forfeiture of the number he may fail to deliver at that time.

Separate proposals must be made for the shot and shell.

Bidders will state explicitly the Arsenal, or Arsenals, where they propose to deliver, and the number of projectiles they propose to deliver at each place, if for more than one.

No bids will be considered from parties other than regular founders, or proprietors of works who are known by this Department to be capable of executing the work proposed for. Should any party obtaining a contract offer shot or shell other than those cast in his own foundry, they will be rejected, and the contract rendered null and void.

Bidders will enclose with their bids the written acknowledgments of their sureties over their own signatures.

Each party obtaining a contract will be obliged to enter into bond with approved sureties for its faithful execution.

Upon the award being made, successful bidders will be notified, and furnished with forms of contract and bonds.

The Department reserves the right to reject any or all bids if not deemed satisfactory.

Proposals will be addressed to "Brigadier-General George D. Ramsay, Chief of Ordnance, Washington, D. C.," and endorsed "Proposals for 8-inch Columbiad Shot," and "Proposals for 8-inch Mortar Shell."

GEORGE D. RAMSAY,
24 2 Brigadier-General, Chief of Ordnance.

ARMY CLOTHING AND EQUIPAGE OFFICE,
Cincinnati, Ohio, May 26, 1864.

PROPOSALS ARE INVITED BY THE UNDERSIGNED until Monday, June 13th, 1864, at 2 o'clock P. M., for furnishing this Department (by contract) with—

Army Blankets, wool, gray (with the letters U. S. in black, 4 inches long, in the center), to be 7 feet long and 5 feet 6 inches wide, to weigh 5 pounds each, of domestic manufacture.

To be delivered free of charge, at the U. S. Inspection Warehouse, in this city, in good new packages, with the name of the party furnishing, the kind and quantity of goods distinctly marked on each article and package.

Parties offering goods, must distinctly state in their bids the quantity they propose to furnish, the price, and time of delivery.

Samples when submitted, must be marked and numbered to correspond with the proposal, and the parties thereto must guarantee that the goods shall be, in every respect, equal to Army Standard, otherwise the proposal will not be considered.

A guaranty signed by two responsible persons, must accompany each bid guaranteeing that the bidder will supply the articles awarded to him under his proposal.

Bids will be opened on Monday, June 13th, 1864, at 2 o'clock P. M., at this office, and bidders are requested to be present.

Awards will be made on Tuesday, June 14th, 1864.

Bonds will be required that the contract will be faithfully fulfilled.

Telegrams relating to proposals will not be noticed.

Blank forms of proposals, contracts, and bonds may be obtained at this office.

The right to reject any bid deemed unreasonable is reserved.

By order of Col. Thos. Swords, A. Q. M. G.

24 2 C. W. MOULTON, Captain and A. Q. M.

PATENTS!!—VALUABLE ENGLISH AND AMERICAN Patents introduced, manufactured, or sold on commission. Conignments respectfully solicited. Address SNYDER & WALTER, 229 Broadway, New York.

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MECHANICAL AND OUT-DOOR PHOTOGRAPHY.—GEO. G. ROCKWOOD, Photographer, 839 Broadway, New York, will, during the Summer months, give his personal attention to Photographing Locomotives, Machinery of all kinds, in shops if necessary, and to taking all kinds of out and in-door views, in any part of the country. Refers to W. G. Hamilton, Jersey City Locomotive Works; B. J. Burnett and C. Holmes, of the Novelty Works; J. M. Toucey, Hudson River Railroad; and others.

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ALCOTT'S CONCENTRIC LATHES—FOR BROOM, Hoe, and Rake Handles, Chair Rounds, &c.—Price $25; and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, No. 12 Plattstreet, New York. b

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FOR SALE.—TWO SECOND-HAND STEAM ENGINES, nearly as good as new. Balance wheels, shafts, pump, &c., all complete. One of 25 horse-power, and one of 12 horse-power. One new, highly finished, 2½ horse Engine, has never been used. One pair of hydraulic press pumps as good as new. Will be sold very low. Address J. W. MOUNT, Medina, Orleans county, N. Y. 23 4* eow

SCROLL CHUCKS MANUFACTURED BY A. F. CUSHMAN, Hartford, Conn., and for sale by all Machinery Dealers. List Prices, 12 inches diameter, $25; 9 inches, $20; 6 inches, $15; 4 inches, $10; 3 inches, $10. 23 5 eow*

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"THE BISHOP GUTTA-PERCHA COMPANY," the only American manufacturers of pure Gutta-Percha Insulated Telegraph Wire for submarine cables, Office Wire, Electric Cordage, and Mining and Blasting Use, etc., respectfully inform their American friends and their customers, the telegraph community of the United States, that they are fully prepared, with ample means and materials, to furnish all the Submarine and other Telegraph Wire, insulated with pure gutta-percha, that may be required for use in this country, and on terms as reasonable as any foreign manufacturers. Apply to SAMUEL C. BISHOP, General Agent of the Bishop Gutta-Percha Company, Office 201 Broadway, New York. 24 4*

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AMESSIEURS LES INVENTEURS.—AVIS IMPORTANT Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Frangais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
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The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

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Improvement in Gas-making.

At the meeting of the Institution of Civil Engineers (London) on the 10th of May, 1864, a paper was read by M. Pernolet, of Paris, on the "Means of Utilizing the Products of the Distillation of Coal:"—

"The author believed that this question had been practically solved by the employment of existing ovens, to which certain inexpensive additions were made, and which, while still giving to the coke all the solidity, density, and luster that distinguished good coke made in the ordinary way, enabled every product of the distillation of coal to be turned to account. This was effected, mainly, by keeping the coal from all contact with the air during its distillation, by performing that process very slowly, and by collecting and making use of the volatile products. The whole arrangement had been sanctioned by many years' experience, both in Belgium and France, where it was actively and profitably pursued at ten different establishments, with more than four hundred ovens, of the largest dimensions, capable of receiving from five to seven tuns of coal at each charge.

"In converting an old oven into one of the improved form, the floor was taken up and raised about a foot, so as to allow of its being heated from below, by means of a fire-grate and flues. A new opening was made in the roof, in which was fixed a pipe, intended to receive the volatile products, and to conduct them to their destination. The ordinary door, and the other opening at the top, were so arranged that they could be kept hermetically closed. A chimney was also added to the masonry ot the old ovens, and this was an essential part of the system, as it secured the circulation of the products of distillation. It had been ascertained that this chimney should be 50 feet high, and not less than 3½ feet square, inside dimensions, for a group of sixteen contiguous ovens; and that the sectional area of the main flue, connecting the different ovens with the chimney, should be three-fourths that of the chimney. In order to try whether the distillation was finished in any one oven, a valve was closed in the outlet pipe; when, if the charring was incomplete, the gas still given off would cause cracks in the loam, with which the joints of the door were closely luted, and thus the necessity for continuing the process was demonstrated. The valve was then simply re-opened, so as to allow the gas again to pass off by the pipe. If, on the other hand, when the valve was closed, no gas escaped at the joints, the charring was known to be finished, and the coke was fit to be drawn. During this operation the valve was closed, to prevent the mixture of the external air with the gases circulating in the outlet pipe, and the cast-iron cover of the opening at the top was kept shut, to avoid the risk of igniting the coke by the draught of air which would be created if it was open. The oven was arranged for charging from the top, by means of wagons running upon rails, and in this way five tuns of coal could be introduced in fifteen or twenty minutes, a rapidity which was most desirable for preserving the heat of the oven. When the charge was being withdrawn and replaced, the gas from the other ovens was allowed to pass continually into the fire-place, so that the floor was kept hot, and the gas accordingly began to show itself, above the opening at the top, only a few minutes after the closing of the door. This opening was then hermetically sealed, and the valve in the outlet pipe being raised, the communication was re-established between the interior of the oven and the great common flue. The products of the distillation were drawn off by the draught of the chimney, together with the condensation of the liquid and the cooling of the gaseous products. After circulating in the great general flue, the products penentrated into the condensing apparatus, where they deposited most of the tar and ammoniacal liquor, and returned to the ovens by the small general flue, whence the gas, purified and dried, passed to each fire.

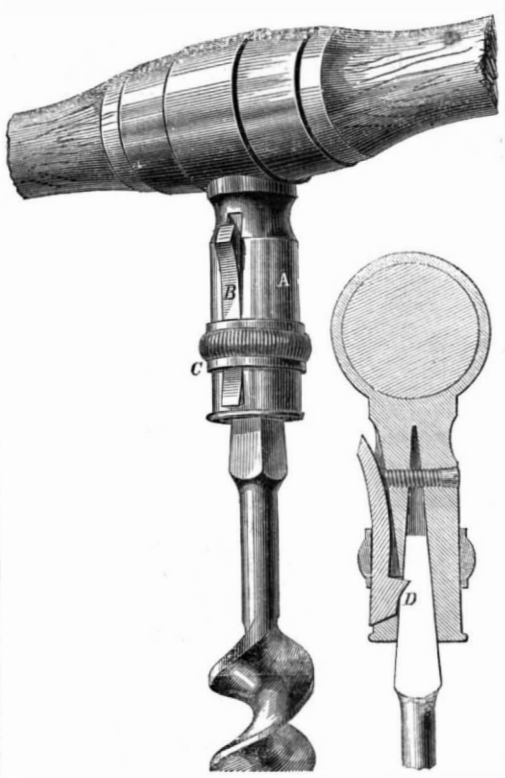
"The time occupied in charring varied with the nature of the coal, and the density desired for the coke, and with the arrangement of the oven. At St. Etienne it took upwards of seventy-two hours, with rich coals, while at Torteron the time occupied was only twenty-four hours, with the rather poor but flaring coals of Commentary.

"As to the cost, it was stated that the expense of altering each oven at St. Etienne was about £20, and that as the value of the additional yield from each oven ought to be about £60 per annum, this outlay should be repaid by four months' work.

"It was asserted that the supplementary products due to these arrangements were, a larger yield of coke, and all the tar, the ammoniacal liquors, and the gas, which would be obtained from the same coals, if distilled in the retorts of a gas manufactory. Thus, in the great coke works at St. Etienne, the yield had been advanced from 58·8 to 69·3 per cent, and in the 'Fonderies et Forges d'Alais,' from 54·6 to 69·5 per cent. Generally speaking, with rich or partially rich coals, the increase in the yield of coke was from 10 to 15 per cent. As to the tar, the proportion collected depended on the nature of the coal, and on the care taken, both in the distillation of the coal, and in the condensation of its volatile products. It had averaged 2·53 per cent. at the Forges d'Alais, 3 per cent at Elonges, 3·25 per cent at St. Etienne, and had reached as high as 5 per cent from the ovens of the Paris Gas-light Company, where only very bituminous coals were employed; but it was thought that there might be reckoned 3 per cent. of tar from the bulk of the coal distilled. The proportion of ammoniacal liquors depended also on the quantity of moisture contained in the coal; but it might be stated at a weight of not less than 10 lbs. of sulphate of ammonia, and sometimes it was as much as 13 lbs. per tun of coal distilled. At the ovens of the Paris Gas Light Company, from 10,000 to 11,000 cubic feet of purified gas were generally obtained from a tun of coal, which yielded from 69 to 70 per cent of coke, fit for delivery to the railway companies."

HUNTER'S BIT AND AUGER FASTENING.

There is no annoyance more insufferable to mechanics who use augers or wood-boring tools than the



detachment of the bit from the brace, whenever the former is withdrawn from the hole; in many cases it seriously retards the work, and is, for other reasons, particularly disagreeable. In the engraving published herewith a plan is shown which completely obviates this trouble, and holds the bit with the grasp of a vise. The arrangement is as simple as it is secure, and consists of a metallic socket, A, in which there is a steel tongue, B, fitted. This tongue sets in a recess and has a milled ring, C, sliding over it. When the ring is slipped up on the shank it bears on a curved part of the tongue and elevates the lower end, so that a catch, D, inside is withdrawn from the notch in the bit: after that it can be taken out. There is also a small screw (see section) at the back, which is used to give the tongue more or less hold in the notch of the bit. This arrangement can be applied to a brace; in the engraving it is shown fastened to an auger handle, but old bits can be used in this new socket with little or no refitting. It is obviously an excellent device, and will no doubt be very popular. It was patented by C. F. Hunter, of Adrian, Mich., on Oct. 27th, 1863, through the Scientific American Patent Agency; for further information address the inventor at Adrian, Mich.

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